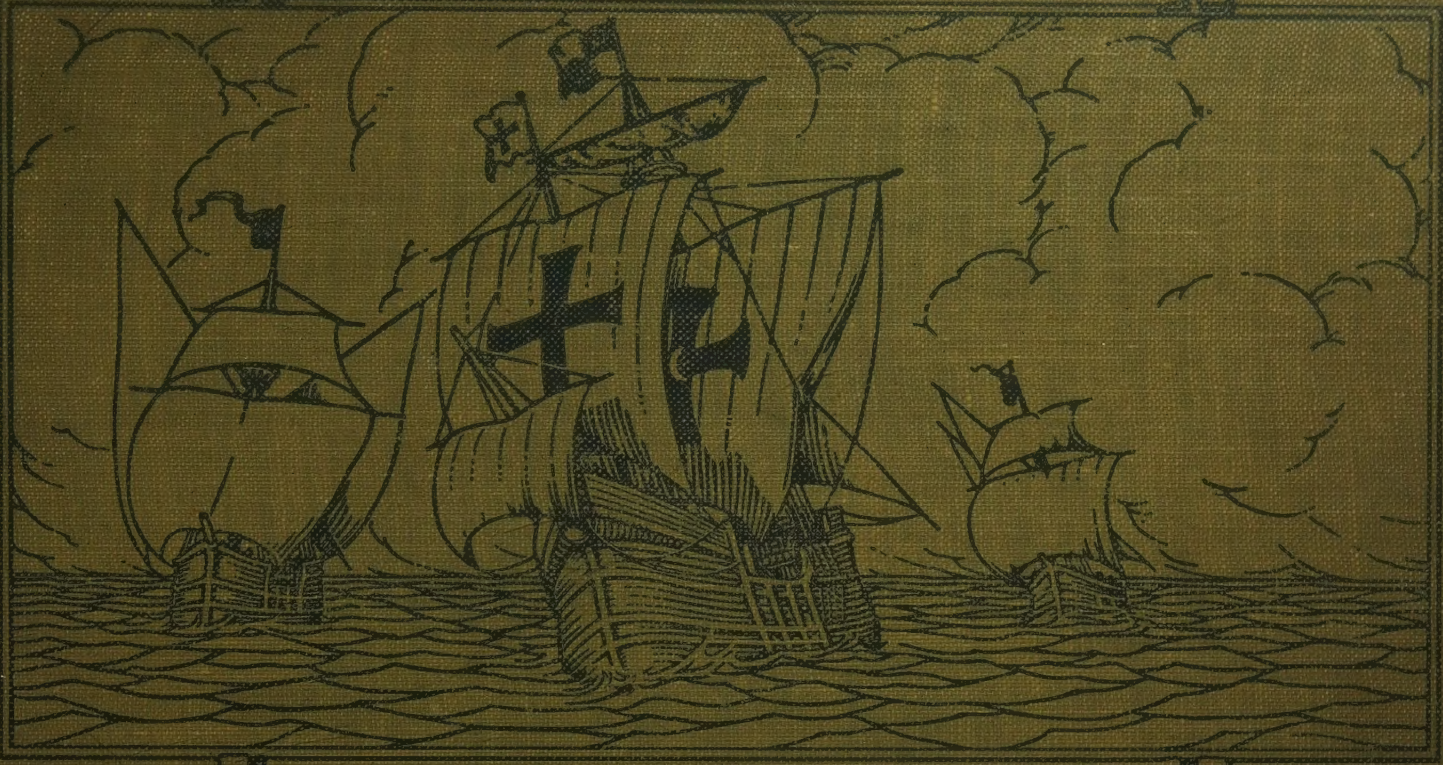
FRYE-ATWOOD GEOGRAPHICAL SERIES



A NEW WORLD LIES BEFORE US

NEW GEOGRAPHY

BOOK TWO

·ATWOOD

GINN AND COMPANY – PUBLISHERS

A MODERN CROP OF INDIAN CORN

And still later, when the Autumn
Changed the long, green leaves to yellow,
And the soft and juicy kernels
Grew like wampum hard and yellow,
Then the ripened ears he gathered,
Stripped the withered husks from off them, . . .
And made known unto the people
This new gift of the Great Spirit. — *Longfellow*

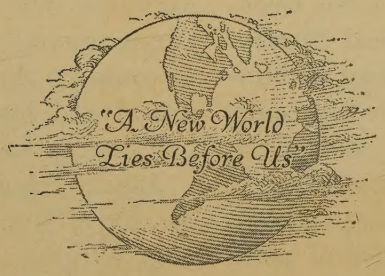
FRYE-ATWOOD GEOGRAPHICAL SERIES

NEW GEOGRAPHY

BOOK TWO

BY

WALLACE W. ATWOOD



GINN AND COMPANY
BOSTON · NEW YORK · CHICAGO · LONDON
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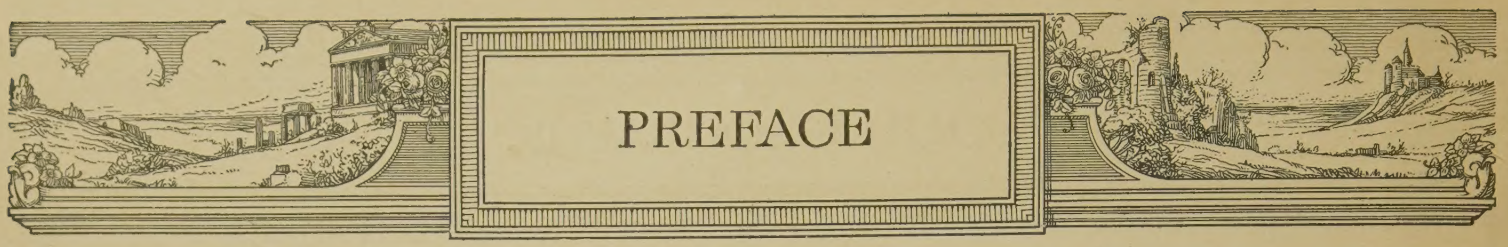

PREFACE

In this series Book One has introduced the child to the study of geography in a most delightful and effective way. After visiting homes in various parts of the world an introductory study is made of the different nations of the earth. Book Two follows a wholly new method of treatment, avoids repetition of matter presented in Book One, and guides the pupil to a much fuller knowledge and understanding of geography.

Human geography is the keynote of the series. Emphasis is given to the study of those factors that have a controlling influence upon the life and activities of people. The "New Geography" becomes an applied science of fundamental significance to all American citizens.

The natural regions of the world, differing as they do in surface features, climate, and resources, have produced widely different occupations and modes of life. They serve, therefore, as the best units for study.

Regional geography is not a new idea; it is the goal toward which the best scientific thought and the best pedagogy have long been progressing. The simplicity and the logic of this approach have each year won new supporters. The one thing lacking has been a textbook constructed on this principle.

Regional maps. The division of the United States into natural regions as shown in this book is the work of the geographers of the Association of American Geographers and of the United States Geological Survey. For the other countries of the world the leading authorities of several nations have been studied. The consistent use of one simple color scheme on the maps enables the pupil to gain most easily a picture of the different physical settings in which the scenes of human life are enacted.

Other maps. A new and very useful series of political and economic maps shows graphically the chief exports and imports. The routes of inland transportation are also clearly shown. From these maps the essential facts of commercial geography can be readily comprehended and easily remembered.

The relief and vegetation maps are also entirely new. By a skillful use of color they show the relief, drainage, and distribution of vegetation. The series of colored rainfall maps indicates effectively the periods of heavy or of light rainfall that are of such great importance in agriculture.

Comparative map studies are introduced as a new feature. With maps in the hands of each pupil, showing the relief, drainage, vegetation, rainfall, and distribution of population, the data are available for the solution of many excellent problems.

Problem method. The understanding of the geographic conditions in a natural region is the fundamental basis for the discussion of problems relative to the life and occupations of the people living in that region. Numerous concrete problems and topics for discussion have been formulated, and many practical exercises that may be assigned for library or home study have been prepared.

Picture study. The illustrations are accompanied by very full legends; each view teaches some important fact. A remarkable series of aëroplane drawings of the great cities and their surroundings assists in a proper emphasis on *urban geography*.

Mathematical geography. While all necessary information has been given as needed, mathematical geography in general has been postponed until the pupil has become familiar with the details that should serve as the basis for such world-wide or universal conceptions.

The United States — a world power. At the close of the book the pupil is brought back to his own country. Against the background of world conditions he now examines our natural resources, the rôle they play in our industrial life, and the care that should be taken to conserve them. This leads to the treatment of our inland and foreign commerce and the development of our international relations and responsibilities.

Acknowledgments. In the preparation of this book Mr. Frye, Mrs. Atwood, Mr. William T. Oliver, several map experts, many government departments, many railroads and chambers of commerce, the Pan American Union, and members of the author's staff and that of Ginn and Company have given most valuable assistance.

The proof sheets were criticized by Miss Nellie B. Allen of Fitchburg, Massachusetts, by Mrs. Jane Perry Cook of the Chicago Normal College, and by Mr. Grant E. Finch of the Montana Normal School.

To all the author expresses his sincere thanks.

WALLACE W. ATWOOD

CLARK UNIVERSITY

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Lofty Peaks in Glacier National Park

NEW GEOGRAPHY

NORTH AMERICA

THE UNITED STATES

During the last hundred years the United States of America has become one of the busiest nations in the world. In every state, from the Atlantic to the Pacific, and from the Canadian boundary to the Mexican frontier, most of the people are very busily engaged in some kind of work. Their occupations and many of their customs depend chiefly upon the geographic conditions in the regions where they live.

We are a hopeful and enthusiastic people. We look forward to having better homes, more beautiful churches, and better schools. We want the people in the country to enjoy the advantages of good roads, mail service, the telephone, and many other comforts, and we look for better living and working conditions in the cities.

Every boy and every girl in this country has an opportunity to rise to a position of great responsibility. The schools are open to all, and everyone who is able and willing to work hard may have the advantages of the highest and best education. Each one will have the *responsibility of citizenship* in a great nation.

To fulfill the responsibility of citizenship, to help the home community, the state, and the nation, each one of us should understand the geography of this country; and at this time, when the United States of America is taking a larger and larger part in affairs of world-wide importance, it is more necessary than ever before that we know also the geography of other countries.

Variety in physical and human geography. Some parts of the United States are warm and other parts are cold; some are well watered and forested, others have a moderate rainfall and are grasslands; and still others are very dry. In some sections of the country there are plains, in some parts there are plateaus, and in other parts there are mountains. *See map opposite page 82.* Vast areas of rich soils have led to farming, and the extensive grasslands have invited many to raise cattle, horses, and sheep. The wonderful supplies of coal, oil, gas, and water-power, together with iron, copper, lead, and zinc, have made possible a most remarkable industrial development. People living on the coast, where there are good harbors, have very naturally become interested in commerce, and throughout the land many are engaged in trade and transportation. Because the physical geography differs so widely in the many sections, the human geography varies also.

Natural regions. For purposes of study, which should lead to an *understanding* of geography, the United States is divided into natural regions. *See map on pages 2 and 3.*

A natural region is a portion of the earth's surface throughout which the geographic conditions which help to determine life do not differ greatly. When a natural region is very large, the climate in the distant parts will differ, and this difference must be considered in explaining the life of the region.

UNITED STATES
PHYSICAL MAP
SHOWING NATURAL REGIONS
Scale of statute miles
0 50 100 200 300 400 500
Scale of kilometers
0 50 100 200 400 600 800
Continental divide
Southern limit of continental glaciation
Routes of migration
Lowlands (Chiefly coastal plain)
Lowlands (Central plains)
Great plains
Uplands and plateaus
Old, worn-down mountains
Young, rugged mountains
Boundaries of natural regions
Average summit elevations in natural regions indicated thus: 500 to 1000 ft.
Comparative Area
IRELAND
Dublin
32,586 square miles
PACIFIC OCEAN
ATLANTIC OCEAN
GULF OF CALIFORNIA
COLUMBIA PLATEAU
COLORADO PLATEAU
GREAT BASIN
MEXICAN PLATEAU
EDWARDS PLATEAU
LLANO ESTACADO OR STAKED PLAIN
COAST RANGES
CASCADE MTS.
SIERRA NEVADA MTS.
ROCKY MTS.
WASATCH MTS.
UINTA MTS.
WESTERN SIERRA MADRE
SONORAN DESERT
LOWER CALIFORNIA
Mohave Desert
Colorado Desert
Salton Sea
Great Salt Lake
Salt Lake City
Yellowstone Nat. Park
Grand Canyon Nat. Park
Mesa Verde Nat. Park
Rocky Mt. Nat. Park
Yosemite Nat. Park
Sequoia Nat. Park
Crater Lake Nat. Park
Glacier Nat. Park
Zion Nat. Park
Seattle
Portland
Spokane
Boise
Reno
Salt Lake City
Denver
Albuquerque
Santa Fe
Phoenix
El Paso
Los Angeles
San Francisco
Sherman
Bismarck
Pierre
Dead
Sweetwater
Pueblo
Longs Pk. 14,255
Pikes Peak 14,110
Mt. Massive 14,421
Mt. Whitney 14,501
Death Valley 280 to 280 ft.
Mt. Rainier 14,363
Mt. Adams 12,326
Mt. Hood 11,225
Mt. Jefferson 10,523
Mt. Shasta 14,161
Mt. Lassen Pk. 10,465
Mt. Mazama 8,000
Mt. St. Helens 9,750
Mt. Baker 10,220
Mt. Olympus 8,000
Mt. Graham 10,484
Mt. Taylor 11,389
Mt. Wheeler 13,058
Mt. Humphreys 12,611
Mt. Tom 12,635
Mt. Whitney 14,501
Grand Canyon San Francisco Mts. 12,794
Black Hills 6,000 to 7,000 ft.
Big Horn Mts.
Wind R. Mts.
Salmon River Mts.
Silver Mts.
Steens Mts.
Owyhee R.
Snake River Plains
Shoshone Falls
Humboldt R.
Black Rock Desert
Pyramid L.
Winnemucca L.
Carson Sink
Walker L.
Ruby L.
Franklin L.
Utah L.
Sevier L.
Sevier R.
Reese R.
Owens L.
Mono L.
Tulare L.
Salinas R.
Monterey Bay
Pt. Cypress
Pt. Arena
Golden Gate
Farallon Is.
Pt. Arguello
Pt. Conception
Santa Cruz I.
Santa Rosa I.
Santa Catalina I.
San Clemente I.
Santa Barbara Is.
Tehachapi
Cimarron R.
Canadian R.
Red R.
Brazos R.
Concho R.
Pecos R.
Rio Grande
Gila R.
Colorado R.
Yuma
Black Mts.
Santiago Mts.
Guadalupe
San Antonio
Nueces R.
Wichita Mts.
Oklahoma City
Kansas
Nebraska
Texas
Mexico
Arizona
New Mexico
Colorado
Utah
Nevada
Wyoming
Montana
Idaho
Oregon
Washington
California
North Dakota
South Dakota
Minnesota
Manitoba
Saskatchewan
Alberta
B.C.
Vancouver I.
Strait of Juan de Fuca
Grays Harbor
C. Flattery
C. Disappointment
C. Blanco
Pt. St. George
C. Mendocino
Mouths of Hwang R. Japan Sea
Fuji Mt.
Mouth of Yangtze R.
Himalaya Mts.
Columbia R.
Snake R.
Clearwater R.
Kootenai R.
Flathead L.
Pend Oreille L.
Coeur d'Alene L.
Bow R.
Red Deer R.
South Saskatchewan R.
Qu'Appelle R.
Assiniboine R.
Lake Manitoba
Milk R.
Frenchman R.
Missouri R.
Musselshell R.
Yellowstone R.
Powder R.
Tongue R.
Little Missouri R.
Grand R.
Owl R.
Cheyenne R.
White R.
Belle Fourche R.
Niobrara R.
North Platte R.
South Platte R.
Lodgepole Cr.
Republican R.
Smoky Hill R.
Arkansas R.
Big Sandy Cr.
Green R.
Yampa R.
White R.
Colorado R.
Dolores R.
San Juan R.
Gila R.
Rio Grande
Pecos R.
Concho R.
Brazos R.
Red R.
Canadian R.
Cimarron R.
Platte R.
Devils L.
Souris R.
Lake Manitoba
Portage la Prairie
Longitude 100° West
Longitude 120° West
Longitude 105° West
Longitude 115° West
Longitude 110° West
Longitude 130° West
Great Bear Lake
Colima
Map Plate, Patented July 5, 1921 • Method of Making Maps, Patented July 5, 1921

from 95° Greenwich
H
90°
J
85°
K
80°
L
75°
M
70°
N
65°
Lake Winnipeg
Winnipeg
Lake of the Woods
L. St. Joseph
Lac Seul
L. Nipigon
Rainy L.
Rainy R.
HUNTER I.
Pigeon R.
ISLE ROYAL
Red R.
Red Lake R.
Red L.
L. Itasca
Source of Mississippi R.
Leech L.
Mississippi R.
Duluth
St. Louis R.
LAKE SUPERIOR
Keweenaw Pt.
MINN.
Mille Lacs
L. Traverse
Big Stone L.
LAURENTIAN UPLAND
500 to 2000 ft.
Minneapolis
St. Paul
Falls of St. Anthony
Minnesota R.
Big Sioux R.
Sioux City
DRIFTLESS AREA
WIS.
Chippewa R.
Wolf R.
Menominee R.
Green Bay
Portage
L. Winnebago
Wisconsin R.
Milwaukee
Grand R.
Dubuque
Cedar R.
IA.
Iowa R.
Des Moines R.
Des Moines
Omaha
Missouri R.
Grand R.
Chariton R.
Rock R.
Fox R.
Kankakee R.
Chicago
St. Joseph R.
LAKE MICHIGAN
Manistee R.
Muskegon R.
MICH.
Saginaw B.
AuSable R.
Sault Ste. Marie
Strait of Mackinac
MANITOULIN I.
Georgian Bay
LAKE HURON
L. Simcoe
Ottawa
L. Nipissing
Ottawa R.
ONT.
QUE.
Mattagami R.
L. St. John
Saguenay R.
Gulf of St. Lawrence
R. St. John
N.B.
Mt. Katahdin 5300
St. Croix R.
ME.
Bay of Fundy
N.S.
Mt. Blanc
Pyrenees
Mt. Vesuvius
Azores Is.
Strait of Gibraltar
Madeira Is.
Canary Is.
Suez Canal
Detroit
St. Clair R.
L. St. Clair
Niagara Falls
Welland Canal
Buffalo
LAKE ERIE
Genesee R.
Cleveland
Maumee R.
Ft. Wayne
IND.
Indianapolis
Wabash R.
White R.
East Fork
Miami R.
Cincinnati
Scioto R.
OHIO
Muskingum R.
Ohio R.
Kanawha R.
W.VA.
Big Sandy R.
Kentucky R.
Licking R.
Louisville
Kentucky River
KY.
Green R.
Cumberland R.
Cumberland Gap
Nashville
TENN.
Tennessee R.
Tennessee River
Ohio River
Illinois R.
Rock Island
Kansas City
Kansas R.
Osage R.
Gasconade R.
MO.
St. Louis
St. Francois Mts.
INTERIOR OZARK PLATEAU
1000 to 1500 ft.
Negro R.
Arkansas R.
White R.
BOSTON MTS.
1000 to 2000 ft.
OKLA.
Ft. Smith
Arbuckle Mts.
HIGHLANDS
OUACHITA MTS.
1500 to 2500 ft.
ARK.
Little Rock
Memphis
St. Francis R.
Black R.
Ouachita R.
Red R.
Dallas
Trinity R.
Sabine R.
Neches R.
Jackson
Yazoo R.
MISS.
Natchez
Pearl R.
LA.
Grand L.
Houston
New Orleans
Galveston
Delta of the Mississippi River
Pontchartrain
Mobile
Mobile Bay
Tombigbee R.
Alabama R.
Black Warrior R.
Cahaba R.
Tallapoosa R.
Birmingham
Atlanta
Chattahoochee R.
Flint R.
Apalachicola R.
Macon
Ocmulgee R.
Oconee R.
Ogeechee R.
Savannah R.
Savannah
Altamaha R.
ALA.
GA.
C. San Blas
C. St. George
Apalachee Bay
CEDAR KEYS
FLA.
Suwanee R.
St. Johns R.
Jacksonville
St. Augustine
C. Canaveral
Tampa
Tampa Bay
Indian R.
L. Okeechobee
The Everglades
LITTLE ABACO I.
GREAT ABACO I.
BAHAMA I.
BAHAMA ISLANDS
ELEUTHERA I.
NEW PROVIDENCE I.
C. Florida
C. Romano
C. Sable
CAT I.
WATLING I.
ANDROS IS.
Florida Bay
Florida Strait
Key West
DRY TORTUGAS
CONTINENTAL SHELF
GULF OF MEXICO
ATLANTIC OCEAN
CONTINENTAL SHELF
Charleston
C. Romain
Columbia
Santee R.
Edisto R.
Pedee R.
Wilmington
C. Fear
C. Lookout
Cape Fear R.
N.C.
Line
Pamlico Sd.
C. Hatteras
Albemarle Sd.
Roanoke R.
Neuse R.
Norfolk
C. Henry
C. Charles
Richmond
James R.
VA.
Chesapeake Bay
Potomac R.
MD.
Baltimore
Washington
Delaware Bay
C. May
C. Henlopen
Philadelphia
Wilmington
Susquehanna R.
PA.
Pittsburgh
Allegheny R.
Monongahela R.
Youghiogheny R.
Kanawha R.
Big Sandy R.
Sheandoah R.
APPALACHIAN MOUNTAIN BELT
2000 to 6000 ft.
APPALACHIAN PLATEAU
1000 to 2000 ft.
Holston R.
Clinch R.
Mt. Mitchell 6711
EDMONT BELT
500 to 1000 ft.
Pedee R.
Savannah Fall Line
Ocmulgee R.
Oconee R.
Ogeechee R.
Altamaha R.
Suwanee R.
St. Johns R.
Hudson R.
Mohawk R.
Albany
N.Y.
CATSKILL MTS.
3000 to 4000 ft.
Susquehanna R.
Delaware R.
Newark
N.J.
New York
LONG ISLAND
CONTINENTAL SHELF
Manchester
Boston
C. Cod
Providence
NANTUCKET I.
MARTHAS VINEYARD
Portland
Connecticut R.
New Haven
CONN.
MASS.
R.I.
N.H.
VT.
GREEN MTS.
2000 to 4000 ft.
WHITE MTS.
3000 to 6000 ft.
ADIRONDACK MTS.
1000 to 5000 ft.
Champlain
Lake
Kennebec R.
Androscoggin R.
Penobscot R.
COASTAL HILLY BELT
100 to 1000 ft.
COASTAL PLAIN
0 to 500 ft.
100
Sabine
Trinity
Brazos
Neches
Red
Ouachita
Arkansas
Yazoo
Tombigbee
Alabama
Chattahoochee
Flint
Apalachicola
Suwanee
St. Johns
Santee
Pedee
Cape Fear
Pamlico Sd.
Albemarle Sd.
Roanoke
Neuse
James
Potomac
Chesapeake Bay
Delaware Bay
Hudson
Mohawk
Susquehanna
Delaware
Allegheny
Monongahela
Youghiogheny
Kanawha
Big Sandy
Sheandoah
Licking
Kentucky
Green
Cumberland
Tennessee
Ohio
Illinois
Missouri
Mississippi
Wabash
White
East Fork
Miami
Scioto
Muskingum
Maumee
Genesee
Niagara Falls
Welland Canal
Lake Erie
Lake Ontario
Lake Huron
Lake Michigan
Lake Superior
Georgian Bay
Strait of Mackinac
Manistee
Muskegon
Menominee
Wolf
Fox
Rock
Iowa
Cedar
Wisconsin
Minnesota
Chippewa
St. Louis
Rainy
Red Lake
Red
Pigeon
Nipigon
Mattagami
Ottawa
Nipissing
Saguenay
St. John
St. Croix
Kennebec
Androscoggin
Penobscot
Connecticut
Champlain
Lake
Mohawk
Hudson

MAP STUDIES — NATURAL REGIONS OF THE UNITED STATES (Pages 2, 3)

1. Where are the young, rugged mountains of the United States? the old, worn-down mountains? 2. Name and locate the three large regions of plains in the United States.

3. The longest river in the world is on this map. Which one is it? *See tables in Appendix.* 4. The greatest system of fresh-water lakes in the world is on this map. Make a list of the lakes. 5. In what mountains is the Continental Divide? 6. Can one go by water from Chicago or Duluth to Europe? Describe the route. 7. The waters from what lakes flow over Niagara Falls? *See page 41, Fig. 74.*

Fig. 1. This steam plow is turning over the rich soil in the Great Plains. Notice the gently rolling country and contrast it with the Rocky Mountains region shown in Fig. 2. Are any states entirely within the Great Plains? What states are partly included in them?

8. What nations sent explorers to this country? *See Appendix, Plate A.* Where did they go? 9. What nation sent the men who sailed down the Mississippi River? Who explored the mouth of the Mississippi River?

10. Learn to locate each of the natural regions. The Appalachian Plateau, the Appalachian Mountains, the Piedmont Belt, and the Coastal Hilly Belt make up the region which is known as the Appalachian Highlands.

11. Make a list of the natural regions, giving the general elevation of each above sea level. 12. Which one of the western plateaus has, in general, the higher elevation? 13. Where is the greatest delta on this map?

14. Suppose the sea withdrew to the edge of the continental shelf, where the water is now 100 fathoms deep, what states would be enlarged? 15. What parts of the United States have good harbors? 16. Trace the southern limit of continental glaciation (ice action) on this map. Through what states does it pass? *See page 10, Fig. 14.*

17. North of that line the land in the United States, except in the driftless area of Wisconsin and neighboring states, has been covered by glacial ice. South of that line in the high mountains there were also glaciers. We must frequently refer to this line, for the surface features, soils, streams, and lakes north and south of it differ very greatly.

18. The routes of migration westward were of great importance in the settlement and development of this country. Frequent reference will be made to them in the text. Trace each one on the map. 19. What city has grown up where many of the western routes left the Missouri River?

20. What was the easiest route through the Appalachian Mountains? 21. Which of the western routes avoided most of the mountains? 22. Which of the western routes had the least desert country? *See map opposite page 82.*

23. What natural regions are crossed by the parallel of 40° north latitude? 24. What two states are separated by that parallel? 25. In what natural region is Great Salt Lake? Yellowstone National Park? the Grand Canyon? Mount Mitchell? Pikes Peak? Mount Whitney?

26. In what region does the Mississippi River rise? the Rio Grande? the Colorado River? the Tennessee River?

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Fig. 2. Glacier National Park, in the Rocky Mountains of Montana, has been set aside by our government as a vacation land for the people. It is a region of rugged mountains with glacier-covered peaks and heavily wooded slopes. In the valleys between the mountains are beautiful glacial lakes

27. In what region does the Arkansas River rise? 28. What peak in Maine is in about the same latitude as Mont Blanc, France? *See eastern margin of map.*

29. What mountains in New York are about one degree farther north than Mount Vesuvius, Italy? 30. Are the New England states and New York in the latitude of northern Europe or southern Europe?

Note to Teacher. Most of the fundamental facts of land forms, water bodies, and the work of streams, winds, and glacial ice have been learned by the pupil in his study of Book I, and this knowledge should be applied in answering the questions on this page. For example, since he has already studied "Divides," he can, with the help of the key in the corner of the map, locate and trace the Continental Divide and interpret the meaning of the term.

The thirty questions given above are merely suggestive of the use which should be made of this, the first map in the book. The teacher should formulate many more questions on this regional map and should devote several class periods to a thorough discussion of all its features. Continual reference to this map is made throughout the entire study of the United States.

Fig. 3. This is Lake Sunapee in New Hampshire, one of the thousands of beautiful lakes which are scattered among the hills and mountains of New England. Notice its irregular shape, its islands and wooded shores, and the cleared land surrounding the farmhouse at the right. In the distance beyond the lake you can see the rolling upland country of the old, worn-down Appalachians. What do the people of this region do for a living? Can you explain why farming is difficult in this part of New England? Why are there so many lakes in New England? Of what use are they?

NORTHERN DIVISION OF THE APPALACHIAN HIGHLANDS

New England

In this portion of the United States, farming, lumbering, and fishing were formerly the chief occupations, but now New England is a great manufacturing district. There must be some good reason for such a change.

Natural resources. *Use map on page 13.* There are excellent harbors on the New England coast, and offshore, in the cold, shallow waters, fish have always been abundant. Forests once covered most of this region, and there are still extensive forests in the northern parts of Maine, New Hampshire, and Vermont. Recently the United States government has established a national forest in the White Mountains, and much of the land in that part of New Hampshire is being purchased by the government and will be reforested. Almost every farm in New England has a wood-lot which supplies fuel for the home.

The broad, flat areas of the Connecticut River Lowland are the most extensive farm lands in this region (Fig. 4), but the lowlands bordering Lake Champlain in Vermont also have fertile soils. In each of the New England states there are many areas of good soils, although much of the land is too hilly or too stony for farming.

Fig. 4. Much tobacco is grown in the southern part of the Connecticut River Lowland. The stalks are cut and hung on racks like this to wilt in the sun. Then they are taken to the barns and dried. The Connecticut valley tobacco is used chiefly for making wrappers for cigars

The rock formations (such as granite, marble, limestone, sandstone, and slate) of which the hills and mountains are made, and often the bowlders scattered about on the surface, are used as building materials. Much of the United States depends upon New England for granite and marble.

The seashore, the islands, the many beautiful lakes (Fig. 3), and the mountains serve as summer resorts. They attract thousands of visitors each year, and in a country where so many people live and work in large cities, such vacation grounds are a real natural resource of ever-increasing value. Many of the lakes serve as reservoirs for city water supplies, others furnish ice, and in many there are good supplies of fish.

Another natural resource of very great importance, and one that helps to explain why New England has become a manufacturing district, is the water-power. Most of the streams, large and small, have falls or rapids in their courses, and in those places dams have been constructed and mills have been erected. Many great plants have been built to transform the water-power into electric power.

Fig. 5. Dairy herds like this are a very common sight in New England. In summer the cows graze over the grassy hillsides, but in winter they are fed indoors. The great cities of New England demand large quantities of milk and butter, and make dairying profitable for the farmer

Even the Connecticut River, the largest stream in New England, is used to generate electricity. In several places a small stream has been dammed to generate electricity on a farm, so that the farmer may light his home and run machines with the power generated by the little stream that flows over his land.

Climate. The rainfall in this region is enough for agriculture and for tree growth, and it is evenly distributed; that is, about the same amount falls each month.

The amount that falls in a year in New England is about 45 inches. *See map on page 82.* In any land where the rainfall is over 80 inches a year, as in the Amazon Basin, there is a very wet climate. In places where the rainfall is less than 20 inches, as in some of our Western states, agriculture is unsafe without the help of irrigation. In the great deserts of the world the rainfall is less than 10 inches a year, and in some, notably the Atacama Desert of northern Chile, it is almost nothing.

Often during the winter in New England there are very heavy snows, and though they cause much extra work and much inconvenience, they are a great pleasure to all who enjoy the winter landscape. The trees to be used for lumber are cut during the winter, and the logs are drawn over the snow to the streams. When spring comes, the melting snows furnish water to the lakes and streams. These waters carry the logs to the mills, and there help to turn the wheels that generate power.

Moisture in the air is very helpful in the spinning of cotton, and thus the climate of New England favors the development of one of the most important of the textile industries (Fig. 7).

The average summer temperature is about 70 degrees, and during the winter the average temperature is about 30 degrees. Temperatures as low as 40 degrees below zero are, however, not unknown to people in this part of the country.

Such a climate, with large seasonal changes, forces the people to look ahead and provide for the future. New Englanders must build good, substantial houses, and, in order that their homes may be warm during the winter months, they must lay in supplies of fuel. Much of the food raised in the summer, such as potatoes and other vegetables, is put away for winter use, and during the winter months enough ice is cut and stored away to last for the next summer. In this way the climate tends to make people vigorous.

Home work. 1. Find out how many inches of rain fall in your home district each year. For what crops is it sufficient? Compare that amount with the amount that falls in New England each year. 2. Read about the life in a logging camp in the Maine woods.

NOTE TO TEACHER. The home work planned in this book may often serve as library or desk work in school. In many cases it may be best to assign certain problems or exercises to individual pupils or to committees to report upon. Encourage oral reports in class.

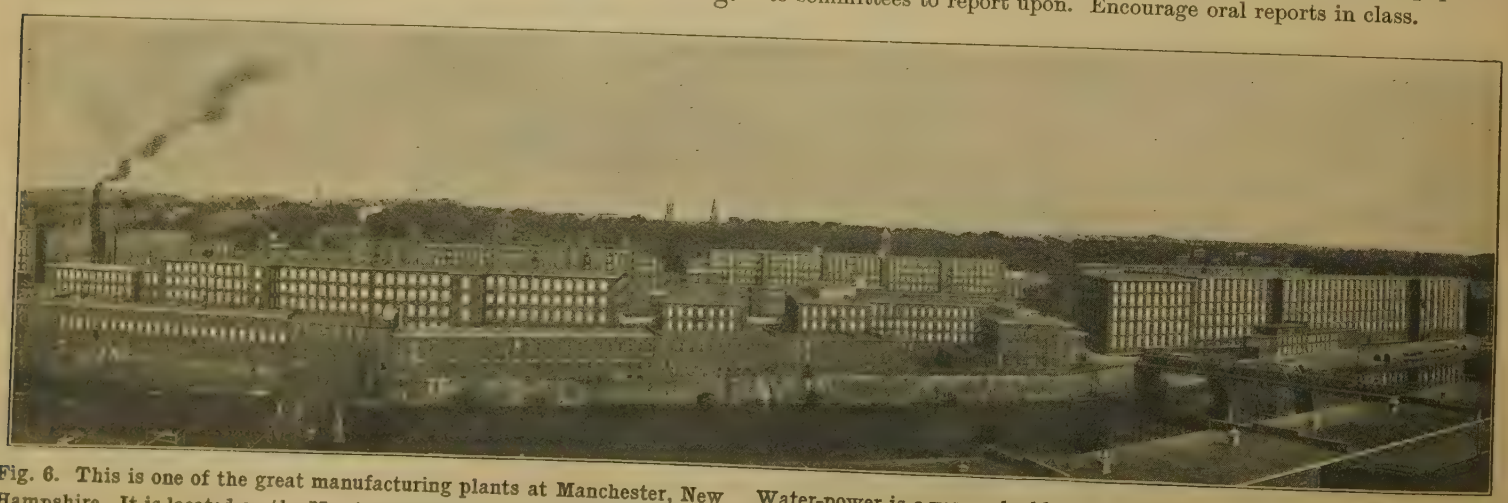

Fig. 6. This is one of the great manufacturing plants at Manchester, New Hampshire. It is located on the Merrimack River at a point where a waterfall occurs and provides power to run the machinery. This one mill turns out over two hundred million yards of cotton and worsted cloth each year. Water-power is a very valuable natural resource. Years ago it could be used only to turn the mill wheels directly, but now the falling water is made to generate electricity, and this hydroelectric power can be transmitted over great cables for use in factories which are hundreds of miles away

Fig. 7. Fall River, Massachusetts, is one of the largest cotton-manufacturing cities in the United States. The city has water-power, but not enough for the industry; most of the mills use steam power. Fall River has a safe, almost landlocked, harbor, deep enough for large passenger vessels and freighters. Locate Fall River on your map. How do the manufacturers get coal to make steam for their mills? Where does the raw cotton come from? Where do most of the manufactured cotton goods go? Explain why New England is one of the two great cotton-manufacturing centers of the United States

Advantages for manufacturing, — summary. The location of New England on the Atlantic seaboard, its many excellent harbors and its numerous rapid streams so well supplied with falls, the moist air, an invigorating climate, and a distribution of rainfall which supplies streams and reservoirs with water throughout the year, are factors which have made possible the rapid development of manufacturing.

The construction of railroads and the improvement in steamship service have greatly assisted the industrial growth. Thousands of people have come to New England to work in the mills and factories.

Settlements and occupations. The Pilgrims first landed near the tip end of Cape Cod, where Provincetown is located, but they soon sailed across the bay and established their first settlement at Plymouth. Each of the good harbors along the New England coast attracted settlers, and the largest coast cities have developed near the best harbors.

Some of the streams are navigable (*see map, p. 13*), and at the head of navigation other settlements were started, such as Augusta and Bangor in Maine.

The settlers who undertook farming needed trading centers where they could sell their products and buy their supplies, and towns soon began to appear in the better agricultural parts of the region.

Little by little each of the seaports and each of the settlements increased in size. Lumbering and shipbuilding were undertaken, and many engaged in fishing. As ships became available and there were fish and lumber to use in trade, some commerce was undertaken; and from those early days to the present time the New England people have become more and more interested in and dependent upon commerce.

The mills demanded raw materials, and in response the ships brought large quantities of cotton from the Southern states. Later, vessels brought cotton from Egypt to be manufactured into cloth in New England. Wool was first furnished from the sheep raised in the New England pastures. To-day wool is brought to Boston from all the leading sheep-raising countries of the world. The small mills were increased in size, until now the New England mills are immense structures (Figs. 6, 8).

With the introduction of railroads more raw materials were brought to this part of the country, food supplies were imported from the great agricultural districts in the interior of the United States, and the manufactured articles of New England were sent west and south to markets that increased rapidly in number and in size.

Fig. 8. Here are the great woolen mills at Lawrence, Massachusetts, on the Merrimack River. The Merrimack turns more factory wheels than any other river in the world. What other cities along this river have important water-power development? Where do the woolen manufacturers at Lawrence get their raw wool?

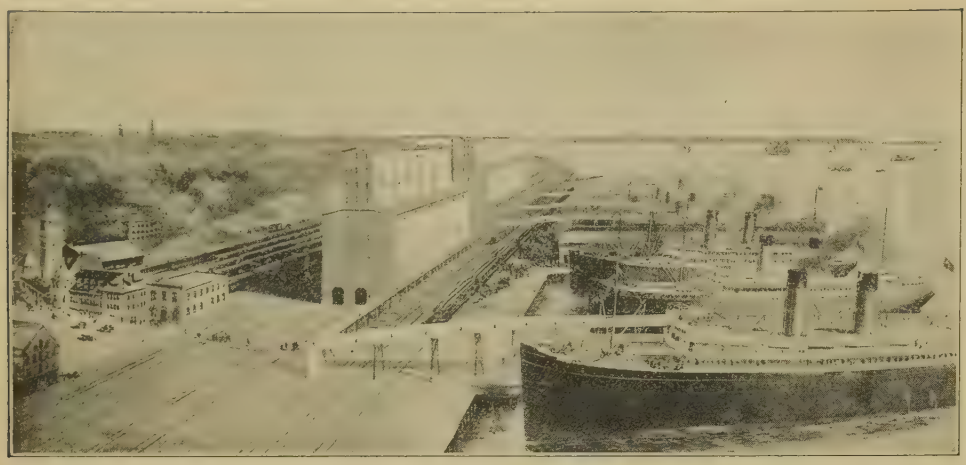

Fig. 9. This is a steamship and railroad terminal at Portland, Maine. In the center, along the wharves, are the railroad tracks and the great storage warehouses. Can you explain the advantage of such an arrangement as this? Portland is the largest city in Maine, with an excellent harbor, deep enough for the largest vessels. What are the chief exports and imports of Portland?

The manufacture of shoes, which began in a small way, has become a very large industry. Hardware, cutlery, watches, and many kinds of jewelry are made on a large scale. The lumbering and shipbuilding have continued, but now many of the vessels are made of steel. Much of the wood of the forests is being made into pulp and used in the manufacture of paper.

In time the water-power proved insufficient, so coal was brought, chiefly from Pennsylvania, in order that more mills and more factories could be built, and that all of them could run throughout the year.

Home work. On an outline map of the United States color in the boundaries of the New England states; print in the abbreviations of the state names; add the names of the capitals and chief seaports. Keep this map and add to it as the study of the United States proceeds.

Location and growth of cities. *Use map on page 13.* Those settlements that were so fortunate as to be located on good harbors or on navigable rivers have become important commercial centers. Beginning at the north we find **Bangor** and **Augusta**. They have the advantage of being seaports and also of being inland cities surrounded by productive lands. Lumbering has helped to develop these cities, for they are near the forests.

Portland has an excellent harbor and has become one of the chief seaports of New England (Fig. 9). **Portsmouth** is the leading seaport of New Hampshire. **Gloucester**, on a very good harbor near Cape Ann, is an important fishing port (Fig. 10).

Boston, the largest city in this group of states, and the capital of Massachusetts, has one of the best harbors in the United States. This seaport has the advantage of being nearer the great European coast cities than New York, Philadelphia, Baltimore, or any other American port farther south on the Atlantic coast (Fig. 11).

New Bedford, Fall River (Fig. 7), and **Providence** are at the heads of bays. The first two are important centers for the manufacture of cotton goods, and they depend largely upon ocean traffic, but Providence is far inland and is making more and more use of railroad service. It is one of the leading cities for the manufacture of silverware and brassware. **New Haven** and **Bridgeport** are busy manufacturing centers on the coast of Connecticut. **Hartford** is an important industrial city at the head of navigation on the Connecticut River.

With the development of railroads much of the trade between the coast cities, which was formerly dependent upon shipping by water, is now carried on by rail. This often saves a great deal of time.

Vermont has no seacoast, but its largest city, **Burlington**, has a good harbor on Lake Champlain. Burlington has a large lumber trade.

A second group of cities in New England owe their location to water-power sites. *See map on page 13.* Beginning again at the north, we find **Lewiston** and **Auburn** on opposite banks of the Androscoggin River, where there is water-power. Near the mouth of the Saco are **Biddeford** and **Saco**, another pair of cities on opposite sides of a stream, where there is power available. **Lowell, Lawrence** (Fig. 8), **Nashua, Manchester,** and **Concord** all depend in part upon the Merrimack River for power (Fig. 6). **Holyoke** is located where there are rapids in the

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Fig. 10. This is a codfish-drying yard at Gloucester, Massachusetts. A great many of the people of the town are engaged in the fishing industry. Some of them catch the fish, others cure and salt it, and still others buy and sell it. Massachusetts salt cod is sent all over the world

Connecticut River, and power was secured by damming the stream. This city manufactures most of the high-grade paper made in the United States. At **Pawtucket**, Rhode Island, at **Norwich**, in Connecticut, and in numerous other places in the New England states, water-power has been developed for manufacturing purposes.

Often the water-power is used to generate electricity, and that form of energy is sent over wires for miles and miles, so that distant cities are furnished with electricity for lighting, for use as power in factories, and for running the trolley cars.

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Fig. 11. This is an aëroplane drawing of Boston. Describe the country surrounding Boston. What rivers enter Boston Harbor? What are the good features of the harbor? Boston imports more wool, hides, and skins than any other port in the world. For what are they used? Boston is the leading fish market of the United States. What does Boston export? How does Boston rank in size among the cities of the United States? *See tables in Appendix.* What places of special historic interest are shown in the drawing? Lynn is best known for shoes, Waltham for watches, and Quincy for granite. Harvard University and the Massachusetts Institute of Technology are in Cambridge. Wellesley College is located at the western margin of the sketch, on the shore of a small lake

A third group of cities (and they are chiefly inland cities) may easily be remembered by associating with the name of the city the particular industry which has been developed there on a large scale.

In the north, **Millinocket** (Fig. 12) and **Rumford**, in Maine, are engaged in making paper from wood pulp.

Courtesy of Great Northern Paper Company

Fig. 12. The town of Millinocket, Maine, has grown up around the largest paper mills in the world. At the left are the great piles of spruce wood ready to be ground into pulp. In the center is the main office building of the plant. Explain the location of this industry here

Barre, Vermont, has wonderful quarries in great hills of granite. **Proctor** and **Rutland**, in the same state, produce large quantities of marble.

Brockton, Lynn, and **Haverhill**, in Massachusetts, manufacture more boots and shoes than any other three cities in the United States. **Worcester** is best known for its iron and steel works. It has large wire mills and many machine shops. **Springfield** is a prosperous city in the Connecticut valley and is an important center for the manufacture of cars, automobiles, and firearms.

Waterbury and **Ansonia** in Connecticut are best known for their brassware. **New Britain** is noted for the manufacture of hardware, **Willimantic** for cotton manufacturing, and **South Manchester** for silk manufacturing.

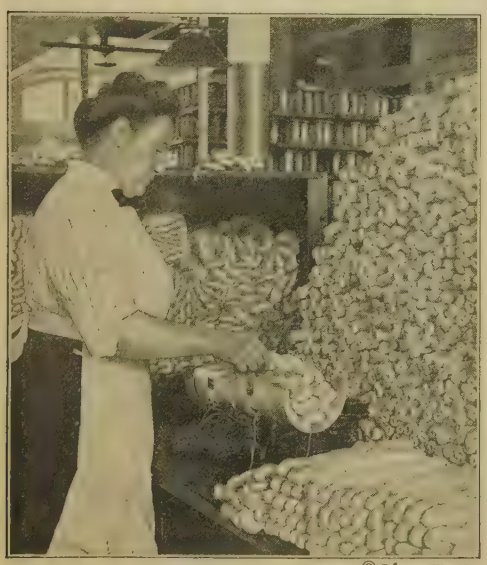
Woonsocket, in Rhode Island, has excellent water-power and is an important center for woolen manufacture.

Home work. On an outline map place the imports and exports of any city in which you are especially interested. The Chamber of Commerce of that city will usually furnish you the necessary information. As the study progresses this exercise could well be repeated for several cities and certainly for the home town.

Explanation of New England Scenery

Mountain-making. Long, long ago the rocks in this part of the continent were subjected to a very great amount of pressure. They were folded and forced high into the air. That made mountains throughout most if not all of New England.

Wearing down. Rains, winds, changes of temperature, freezing of water in the cracks of rocks, helped to break up the mountain tops, as the rocks are being broken up on the top of Mount Washington and all high mountains to-day. Little by little, streams cut their valleys deeper and deeper, and took the loose material away to the sea. A long period followed, when the land was being worn down and the high mountains were reduced to low mountains or to hills.



© Keystone View Co.

Fig. 13. This woman is sorting and weighing skeins of raw silk in a silk mill at South Manchester, Connecticut. Connecticut is the only New England state which has developed an important silk-manufacturing industry

Ice invasion. While the streams were at work cutting down the highlands a more remarkable thing happened. A great ice-sheet formed on the land east of Hudson Bay (Fig. 14). For years more snow fell each winter in that region than melted in the following summer. Thus a great snowbank was formed. In the bottom of that snowbank, as the snow was compressed, ice was formed, in much the same way as ice is formed when you press a snowball in your hands. In time the huge ice mass began to move. As it advanced it gathered stones and rocks and soil, so that when it came into New England it was rock shod. As it moved southward it wore off the hill-tops and broadened the valleys (Fig. 15).

This great ice-sheet covered even the highest mountains in New England. On the top of Mount Washington there are stones that the ice-sheet left there, and on the top of Mount Monadnock, in southern New Hampshire, the bare rock surfaces still show the scratches that were made by the stones frozen into the base of the ice-sheet when it passed over this summit. The glacier advanced until its southern margin was in the Atlantic Ocean (Fig. 14). The islands of Marthas Vineyard and Nantucket were in part covered by the ice. On the southernmost shores of Marthas Vineyard there are rocks that the glacier carried from the mainland and left there when it melted.

About half of Long Island was covered by the ice-sheet, and the belt of hills that extends from east to west through the middle of the island is made of stones, sands, and clays left by the ice (Fig. 39). That belt of hills is a part of the deposit left by the glacier and marks the southern limit of ice advance in that region.

Retreat of the ice. When the climate grew warmer, the ice slowly melted away. All the stones that were in the glacier were left on the ground. The streams that came from the melting glacier washed some of the sands and gravels southward, and in many places made great plains of that loose material. This explains why New England has so many bowlders, and why in some places the soil is sandy and gravelly.

Waterfalls, rapids, and lakes. As the ice melted farther to the northward the material which it left blocked many of the stream courses. The rivers had to find new ways to the sea. In doing this they sometimes had difficulties. There was hard rock to be cut away. This is the explanation of the falls and rapids. Streams commonly have falls or rapids where they cross hard rock. Other streams were so blocked by the deposits of glacial material that the waters could not get out, and so hundreds of ponds and lakes came into existence. Where such ponds and lakes have been drained there are fertile meadow lands.

Fig. 14. This map shows the extent to which North America was covered by ice in the glacial period. Where were the four great centers of snow accumulation? Which of these centers has an ice-sheet to-day?

Note to Teacher. Each pupil should be encouraged to make a collection of pictures and to prepare a portfolio or a scrapbook. Advertising booklets, newspapers, and magazines will furnish an abundance of material. As the study of geography proceeds, the pupils should bring to class the pictures they have obtained of the country under consideration, and thus additional illustrations, in which the pupils are especially interested, will be available for each lesson.

Home work. 1. Arrange your own pictures of New England in groups showing the scenery or occupations. 2. Write at least fifty words of description about each one.

Inlets and harbors. When the ice advanced through the valleys to the coast, it deepened these valleys and dug out great quantities of the earth. When it retreated, there were deeper channels which helped to make the large inlets where the best harbors are now located. The retreat of the ice from Boston Harbor left hills of earth that rise above the sea as islands, and these islands are a natural protection for the harbor.

Sinking of the land. Another wonderful thing has happened which has helped New England. The land near the shore has been depressed, or lowered, and the sea waters have advanced into the mouths of the rivers. For this reason New England is said to have a "drowned coast." The drowning and the ice action have made the coast irregular and produced the good harbors.

© Henry G. Peabody

Fig. 15. This is Crawford Notch in the White Mountains of New England. Notice the gently rounded, forest-covered slopes, and contrast them with the sharp, rugged peaks in Fig. 2 on page 4. The White Mountains are part of the old, worn-down Appalachian Highlands, which form the highest land in the eastern United States

The rock islands off the coast of Maine and New Hampshire are due chiefly to the sinking of the land. They are hill-tops, standing with only their heads out of the water (Fig. 16). We shall find that the elevation of many lands above sea level has been changed; some of them have been depressed and others have been uplifted.

Lafayette Park. A portion of Mount Desert Island on the coast of Maine has been set aside as the Lafayette National Park. This is the first national park east of the Mississippi River.

Summary. Almost everything of natural origin in New England has proved to be a real resource to man: the harbors, the streams with their water-power, the forests, the soils, and the underlying rocks. The moist climate,

Fig. 16. Bar Harbor is one of the many beautiful summer resorts on the Maine coast. The islands which you can see in the view are just the tops of hills which used to stand entirely above water. Because the coast has sunk, Maine is said to have a "drowned shore line"

with enough rainfall for farming and for the lakes and streams, has proved to be a natural resource. The mountain scenery, the many lakes, and the seashore are true natural resources. As a busy people we need playgrounds, we need vacations, and these restful and beautiful spots are now of great value to us.

The future. New England will always be an industrial, or manufacturing, district. There are natural advantages here which will continue to give this part of the country the leadership in certain lines of manufacturing. The forests, now in part held by the government, will be more wisely cared for. The fishing interests should be conserved. The great supplies of building stone will last almost indefinitely. Market-gardening, dairying, and poultry-farming may all be developed much more extensively, and the planting and care of apple trees should be promoted. With scientific care many of the abandoned farms will again become productive.

Fig. 17. The woolen mills at Winooski, Vermont, owe their location to the falls of the Winooski River. More and more of the New England waterfalls are being harnessed and made to produce power for industry. What are the chief products of New England manufacture?

Problems and review questions. 1. Where were the first settlements of white people in this region? 2. What natural advantages led to the location of these settlements? 3. What natural advantages led to the more rapid growth of Boston? 4. What disadvantages did the early settlers find in this region?

5. To what occupations did the forests lead? the water-power? 6. Where are there wood-pulp mills? 7. For what is the pulp used? 8. Why was sheep-raising undertaken by many New England people? 9. What factors led to the abandonment of New England farms?

10. What leading cities have been much benefited by a location on the coast? 11. What cities have developed at the head of navigation on certain of the rivers? 12. What river in New England has been most used in developing water-power?

13. Why are the mouths of the New England rivers wide and deep? 14. What is the largest river in New England? 15. What are the chief manufactured products of New England? 16. Why has New England become a manufacturing region?

17. Name a leading cotton-manufacturing center; a woolen-manufacturing center; two cities where boots and shoes are made in large numbers. 18. Could New England get along easily without importing foods from other regions? Why?

19. What foods has New England in such quantities that some may be exported? 20. Where does the fuel for New England come from? How is it sent? 21. Why should there be so many large bowlders in the fields? 22. Why do we find scratched and polished rock surfaces along the coast of Maine and on many of the mountains?

23. How much of New England was formerly covered by ice? 24. Where did this ice come from? 25. How was the ice formed? 26. Why did the ice disappear? 27. Why do the farmers build stone walls about their fields in New England? 28. How do the attractive summer resorts along the coast and in the mountains benefit New England?

MAP STUDIES

Maine. The White Mountains that center in New Hampshire extend northeastward into Maine, but do not reach quite to the eastern border of the state. Note on the map the curving brown line which runs from Saddleback Mountain to a point near Houlton. North of this line the land bordering the old, worn-down mountains is a plateau country. South of this line the land is part of the Coastal Hilly Belt.

All of Maine is within the Appalachian Highlands, where there is a pleasing variety in the surface features. Lakes and streams are abundant. The irregular coast has numerous picturesque inlets and islands. 1. Locate Mt. Katahdin and give its elevation. 2. Name two navigable rivers; three large lakes.

New Hampshire. The center of scenic interest in this state is Mt. Washington, and the outlook from the summit is over the Presidential Range and the beautiful lake district in the bordering hilly country. The lowlands near the Connecticut River and small areas among the hills of the Coastal Belt furnish attractive opportunities for farming. The state is fortunate in having large supplies of good building stone, extensive forests, and an abundance of water-power.

Vermont. The Green Mountains extend from north to south through this state. In the northwest are the fertile agricultural lowlands that border Lake Champlain, and in the southeast the farm lands of the Connecticut River Lowland. The mountains are forested and furnish large quantities of lumber. The granites and marbles of the mountains are used as building and ornamental stones, and the valleys between the ranges are used as farm lands. Water-power is available in many places.

Massachusetts. This state is fortunate in having a great variety in surface features and soils. The Connecticut River Lowland is between two belts of old, worn-down mountains. To the west are the Berkshire Hills. They represent the southward extension of the Green Mountains. To the east are the Central Highlands of Massachusetts. They are the southward extension of the White Mountains. Farther east is the Coastal Hilly Belt, and in the extreme southeast a little of the Atlantic Coastal Plain. Cape Cod, Nantucket, and Marthas Vineyard are in the Coastal Plain region and have light, sandy soils. The hills and mountains contain building stones, much of the land is suitable for farming, and nearly every stream furnishes water-power.

Rhode Island. This is the only state entirely within the Coastal Hilly Belt. The sinking of the land has allowed the sea to advance inland and form Narragansett Bay. Here there are good harbors and many islands and peninsulas that furnish attractive sites for seaside homes and resorts.

Connecticut. Near the coast this state is hilly, and the hills become higher to the north and northwest near the old, worn-down mountains. The Connecticut River Lowland crosses from Hartford to New Haven, but the river leaves the Lowland at Middletown and flows southeastward to Long Island Sound. The manufacturing centers of this state are fortunate in being near the great markets of the city of New York.

GENERAL QUESTIONS

1. Are the products of New England all used there, or are some exported? 2. What countries do New England manufacturers draw upon most for raw material? 3. Why should the New England farmers give so much attention to dairying, gardening, and poultry-raising?

4. Where do the grains and meats come from that are exported from Boston and Portland? 5. What conditions offshore make favorable fishing grounds? 6. What are the chief crops of the Connecticut River Lowland? 7. Where is maple sugar made in large quantities?

8. Where is granite obtained? Where is marble obtained? 9. How may the irregular coast line of New England, which has given such good harbors, be explained?

10. What rivers in New England are navigable? 11. To what state do Nantucket and Marthas Vineyard belong?

12. What state in this group is without a seacoast? 13. What water route is there from Burlington, Vermont, to the sea? 14. Is Boston or Buffalo farther from the equator? *See western margin of map.*

15. Compare the latitude of Providence with that of Cleveland, Ohio. 16. What city in France is in about the same latitude as Bangor, Maine? *See eastern margin of map.* 17. What New England states border on the Canadian frontier?

Note. For a study of New England cities see pages 8 and 9.

NEW ENGLAND STATES
POLITICAL AND ECONOMIC MAP
Scale of statute miles
0 25 50 75 100 125
Scale of kilometers
0 25 50 100 150 200
☆ State capitals
Navigable rivers
Chief seaports
Large water power sites
Lowlands
Uplands and plateaus
Old, worn-down mountains
Military Camp
Camp Devens, D 6
Long. 71° West from 70° Greenwich
ATLANTIC OCEAN
CANADA
Quebec
Montreal
Sherbrooke
St. Johns
Valleyfield
Rouses Point
Plattsburg
Burlington
Montpelier
Barre
Middlebury
Rutland
Bennington
Brattleboro
Hartford
Springfield
Northampton
Pittsfield
Greenfield
Albany
Troy
Schenectady
Saratoga Sprs.
Hudson Falls
Ticonderoga
Lake Champlain
ADIRONDACK MOUNTAINS
VT.
N.H.
MASS.
CONN.
R.I.
N.Y.
N.J.
Concord
Manchester
Nashua
Keene
Claremont
Lebanon
Haverhill
Berlin
Lancaster
Gorham
Franconia
Lisbon
Woodsville
Littleton
Waterbury
Barton
Newport
Derby
Swanton
St. Albans
Milton
Essex
Winooski
Colebrook
Stewartstown
Northumberland
Stratford
Island Pond
Lyndonville
Morristown
Hardwick
Waterbury
Randolph
Bethel
Brandon
Orford
Plymouth
Canaan
Hanover
Rutland
Woodstock
Windsor
Ludlow
Springfield
Chester
Manchester
Bellows Falls
Walpole
Hillsborough
Claremont
Newport
Franklin
Laconia
Farmington
Rochester
Somersworth
Dover
Newmarket
Portsmouth
Exeter
Goffstown
Peterboro
Milford
Nashua
Derry
Newburyport
Haverhill
Lawrence
Lowell
Gloucester
Fitchburg
Leominster
Clinton
Concord
Lynn
Salem
Beverly
Danvers
Marblehead
Malden
Cambridge
Somerville
Boston
Quincy
Weymouth
Braintree
Brockton
Plymouth
Cape Cod
Provincetown
Duxbury
Mansfield
Attleboro
Taunton
Middleboro
Fall River
New Bedford
Falmouth
Monomoy Pt.
Nantucket Sound
Edgartown
Nantucket
NANTUCKET I.
MARTHAS VINEYARD
Chatham
Barnstable
Cape Cod Bay
Plymouth
Marlboro
Framingham
Newton
Waltham
Worcester
Webster
Southbridge
Palmer
Ware
Holyoke
Chicopee
Westfield
Dedham
Milford
Franklin
Woonsocket
Central Falls
Pawtucket
Providence
Pawtucket
Warwick
Bristol
Newport
Narragansett Pier
Block I.
Montauk Pt.
Long Island Sound
LONG ISLAND
Stamford
Greenwich
Port Jefferson
Bridgeport
Milford
Branford
New Haven
New London
Essex
Meriden
Wallingford
Middletown
Waterbury
New Milford
Torrington
Winsted
Kingston
Poughkeepsie
Newburgh
Hartford
S. Manchester
Rockville
Thompsonville
Putnam
Willimantic
Plainfield
Norwich
Danbury
Bethel
Ansonia
Derby
Naugatuck
Thomaston
Watertown
Farmington
New Britain
Bristol
Hudson R.
Connecticut R.
Housatonic R.
Merrimack R.
Androscoggin R.
Kennebec R.
Penobscot R.
St. John R.
St. Lawrence R.
Richelieu R.
Lake Memphremagog
Lake Champlain
Lake George
Lake Winnipesaukee
Lake Sunapee
Mt. Monadnock
Mt. Washington 6,293
Presidential Range
WHITE MTS.
Mt. Mansfield 4,364
Saddleback Mt. 4,005
Mt. Katahdin 5,200
Moosehead Lake
Chesuncook Lake
Allagash L.
Heron L.
Chamberlain L.
Millinocket L.
Schoodic L.
Grand L.
Lakes
Rangeley Lakes
Rangeley
Dead R.
Androscoggin R.
Kennebec R.
Penobscot R.
Allagash R.
Aroostook R.
Wallpoole R.
St. John R.
St. Francis R.
Chaudiere R.
Richelieu R.
St. Lawrence R.
Connecticut L

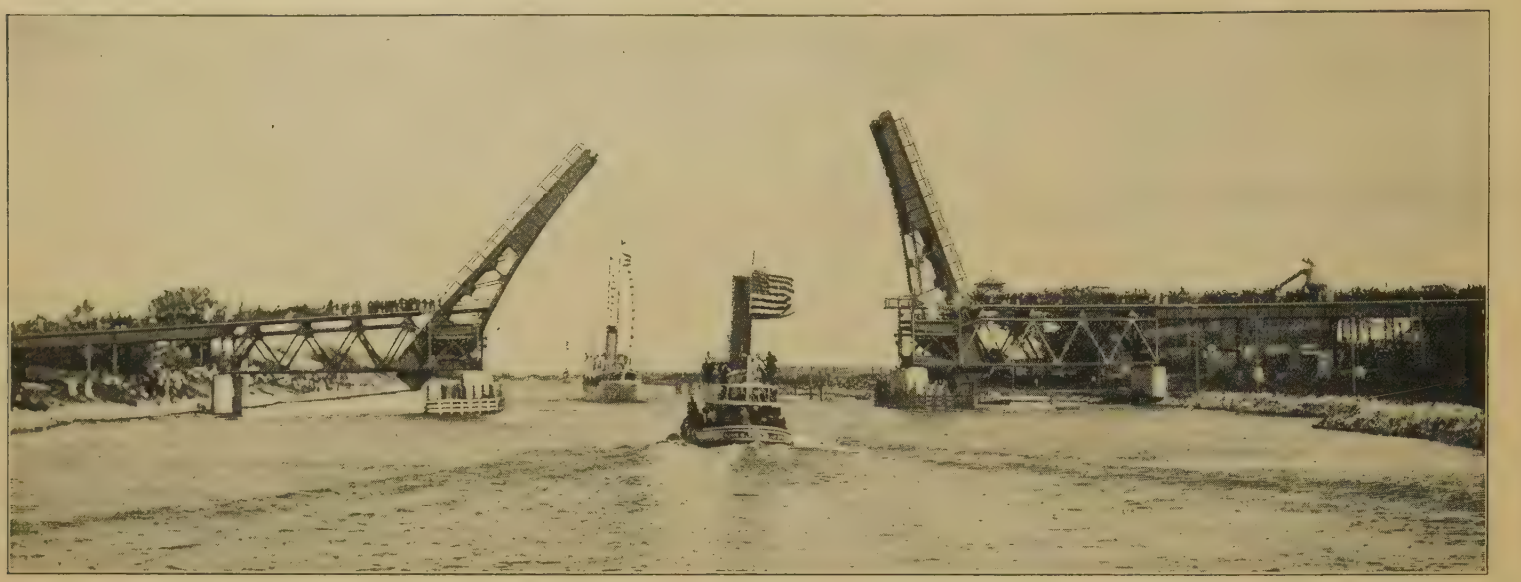


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Fig. 18. The Cape Cod Canal in Massachusetts was opened in 1914. It connects Cape Cod Bay with Buzzards Bay, making a short, safe route from Boston to Long Island Sound, in place of the long, dangerous trip around the Cape. Here is a tugboat passing through a liftbridge over the canal. The canal is 8 miles long, 100 feet wide, and 25 feet deep, making it possible for large vessels to pass through it. Its cost was twelve million dollars, but already it has saved merchants and shippers many times that amount. Locate the canal on the map on page 13. In what natural region is it?

ATLANTIC AND GULF COASTAL PLAIN

To open the study of this natural region, examine each of the pictures from Fig. 18 to Fig. 39, reading the statements below the pictures. Make a list of all the facts you discover in this way. What are the occupations of the people? Is the country rough or smooth? Is it wet or dry? Are any rock ledges shown? Are there any great bowlders in the soil, as in New England? What are the principal crops? Make a list of the seaports shown in the views. What parts of this area appear to be the warmest? The maps and the text will supplement what has been learned by studying the pictures.

Climate. The Coastal Plain extends so far from north to south that the climate at one end differs greatly from that at the other end. The temperature along the Gulf coast is about 85 degrees in summer and about 50 degrees in winter. Farther north, along the Middle Atlantic states and the southern shores of New England, the summers are warm, but the winter temperature often falls below zero. Many of the beaches of New Jersey, Long Island, and eastward to the end of Cape Cod are used as summer resorts, and many of the beaches in the South, especially in Florida, are winter resorts.

The Gulf Stream flows northward along the Atlantic coast; it brings warm waters northward and keeps the air near the coast, both over the sea and over the land, somewhat warmer than it would otherwise be.

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Fig. 19. These are brave men of the United States Coast Guard. They patrol the coast and go to the rescue of ships in distress. This view shows one of their large life-saving boats

Along the east Gulf and Atlantic coast, within this region, the rainfall varies from 40 to 60 inches a year. That is enough for agriculture. West of the Mississippi River the rainfall decreases from about 50 inches to 20 inches near the Rio Grande. At the Mexican frontier agriculture is uncertain unless irrigation is practiced.

Storms often originate over the warm waters of the tropics and start inland across the Gulf coast or northward along the Atlantic coast. These storms commonly bring rain to the coastal lowlands. Some of the storms are dangerous to coastwise shipping, but the United States Weather Bureau stations in the West Indies and on the mainland now send out warnings by wireless, so that sea captains may know when such storms are near and what way they are traveling. The captain who receives such warning may change his course and thus avoid meeting the storm.

Natural resources. The Atlantic and Gulf Coastal Plain includes extensive areas of good farming land. In many places the soils are light and sandy. Such soils, when fertilized, are suitable for the raising of fruit and vegetables. In Long Island, in New Jersey, and farther south near each of the larger cities the

Coastal Plain soils are used for market-gardening and fruit-raising. In other parts of the Coastal Plain the lands are used for general farming.

Deposits of phosphate rock are available in several localities (*see map, p. 23*), and that rock, when pulverized, makes an excellent fertilizer (Fig. 20).

Fig. 20. This is a phosphate-mining plant in Florida. The phosphate rock is dug out of pits, loaded onto little cars, and carried to the crushers, where it is ground up. The state of Florida produces half the world's supply of phosphate rock. For what is it used?

A large part of the Coastal Plain is still overgrown with a pine forest. This forest is one of the most valuable of the natural resources, and furnishes much of the lumber used in the Southern states and even in the Northern states for building purposes. There are also large cypress groves in the Southern states, where lumber is obtained.

Near the coast, where the climate is warm enough, the lowlands are used for cultivating rice (Figs. 21, 22). The great alluvial, or river-made, lands near the Mississippi River and on the Mississippi delta are wonderfully fertile, and there large crops of sugar (Figs. 25, 26), rice, and cotton are raised.

Offshore, the shallow waters which cover the continental shelf abound in fish, many varieties of which are used as food. The quiet waters of the drowned river mouths provide great quantities of oysters, and the warm waters which surround the southern end of Florida contain large numbers of valuable sponges and turtles.

On the map on page 25 notice in what parts of Louisiana and Texas natural oil, or petroleum, and natural gas have been discovered (Fig. 24), and in what parts of Texas coal is found. The coal in the Coastal Plain region of Texas is lignite, a soft, brown coal, somewhat woody in appearance. The coal farther north, in the Central Plains portion of the state, is bituminous, the grade commonly known as "soft coal," and very widely used in manufacturing.

Louisiana and Texas also have important sulphur beds, which provide the largest source of supply in the country.

The navigable rivers and the harbors of the Coastal Plain must also be counted among the chief natural resources of this region. Notice on the maps on pages 23 and 25 how many of the rivers of this region are navigable, and what seaports are located near their mouths.

Occupations. Agriculture is quite evidently the chief occupation in this region. Many farmers who formerly thought that the Central Plains region was the best part of the country to live in have migrated to the southern plains, where it is not necessary to spend much for warm clothing or for coal. The settlers may work out of doors most of the time, and such healthful work is becoming increasingly attractive to large numbers of American people.

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Fig. 21. These men are cultivating a rice field on the Coastal Plain. Rice is not a native grain of North America, but came originally from Asia. In 1694 the governor of South Carolina planted a little rice in his garden, and it grew so well that the industry was started in this country

Fig. 22. After the rice is harvested it is threshed in a machine which separates the kernels from the straw. This view shows the threshing machine and the stack of straw in the background, and in the foreground the bags of rice ready to be shipped. What states produce rice?

Fig. 23. On the large Southern cotton plantations the picking is usually done by negroes, but on the smaller farms this work is often done by the owner and the members of his family. What are the chief cotton-growing states? In what two natural regions is the cotton grown?

The greatest cotton-producing region in the world is located in the Southern states, where the climate is warm (Fig. 23). The large farms are called plantations. The cotton crop requires the help of thousands of people. In the fields there is the work of planting, cultivating, and harvesting. The cotton fiber must be picked from the bolls by hand and carried to the cotton gins, where the lint cotton is separated from the seeds and baled. It is then ready for market.

The seeds of the cotton are sold to the oil mills. In the mills the seeds are first put through a process by which all the short lint left on them by the gin is removed; this is called linters and is used for making mattresses and guncotton, and for other purposes. The hulls are then removed from the seed. The cottonseed hulls make excellent feed for cattle and are nearly as valuable for this purpose as hay. The oil is then pressed out of the seed; cottonseed oil is used as a substitute for olive oil and lard and for other purposes. The residue of the seed, after the oil has been extracted, is called cottonseed-oil cake; this cake is ground into meal, and cottonseed meal is used for cattle feed and for fertilizer. It is very rich in nitrogen and is largely used in commercial fertilizers for furnishing this element.

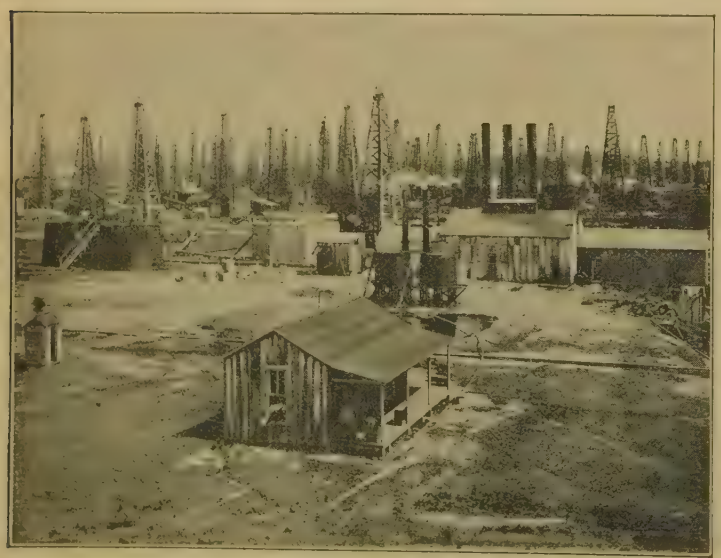

Fig. 24. The petroleum fields of the Gulf Coastal Plain are dotted with derricks like these, each built over an oil well. The Gulf Field, as the oil region of Louisiana and Texas is called, was opened up about 1900, and since then these two states have become very important producing centers

Fig. 25. Railroad lines run through the broad fields of sugar cane in Louisiana, and as the cane is cut it is loaded onto the cars and taken to the mills, where it is crushed and the juice extracted. Louisiana produces eleven twelfths of the total sugar-cane crop of the country

Two enemies of the cotton plant are the cotton-boll weevil and the pink bollworm. The weevil attacks the cotton plant, but the pink bollworm makes its way into the cotton seeds and is thus more destructive than the weevil. The United States government is making a great effort to kill off these insects in the areas where they have established themselves.

More and more of the cotton grown in the Southern states is now being manufactured into cloth in the South. The cotton mills are operated by water-power, steam-power, and hydroelectric power.

From the earliest days of colonization rosin and turpentine have been obtained from pine resin. These products are commonly called naval stores, because they were used in preparing wooden ships for the water (Fig. 32).

In New Jersey the sands of the Coastal Plain are used in the manufacture of glass, and the clays from the lowlands have led to the establishment of the pottery business.

Since the discovery of petroleum, or natural oil, in Louisiana and Texas these states have rapidly developed a large oil business. Large quantities of the petroleum obtained from the ground are piped to ports on the coast and then shipped to industrial centers. A great amount of sulphur is mined in these two states, and Louisiana produces great quantities of salt.

History of settlement. The Coastal Plain is especially interesting to us from a historical standpoint. Provincetown, protected by a curved sand bar, or hook, at the tip end of Cape Cod, has grown up near where the Pilgrims first landed in America before making their settlement at Plymouth.

Fig. 26. This is a great sugar refinery in Louisiana. The raw sugar, which is the crystallized juice crushed from the cane, is brought here to be purified. First it is melted, then filtered and cleared, and finally recrystallized into the white sugar of commerce. Where does the raw sugar for this refinery come from?

When settlers came to Delaware Bay, to Chesapeake Bay, and to the mouths of navigable rivers farther south, they moved upstream to the head of navigation. That was at the inner margin of the Coastal Plain. *See maps on pages 23 and 35.* At that line falls were encountered in the rivers, and the ocean-going vessels had to stop.

Where falls were met in the James River, Richmond was established. The colonists who moved up Chesapeake Bay located Baltimore at the inner margin of the Coastal Plain. Those who attempted to go up the Schuylkill stopped at the falls in that river and founded a settlement that has grown into the great city of Philadelphia. In trying to go up the Delaware River, falls were encountered where Trenton is now located.

Columbia, in South Carolina, is at the head of navigation, as are Augusta, Macon, and Columbus in Georgia, and Montgomery in Alabama. Many other cities have grown up along this inner margin because of the falls that were there. The line connecting these cities is called the *fall line*. It is the western boundary of the Atlantic Coastal Plain, and it continues westward, forming the northern boundary of the eastern part of the Gulf Coastal Plain. *See map on pages 2 and 3.*

In the Southern states a number of early settlements were made near the mouths of the larger rivers, and they became seaports, such as Wilmington (North Carolina), Charleston, Savannah, Jacksonville, Mobile, and New Orleans.

Several of the early Spanish and French explorers came to the mouth of the Mississippi and went up that river into the interior of the continent. *See Appendix, Plate A.* The names in the Mississippi Valley, such as New Orleans, Baton Rouge, and St. Louis, suggest that the French nation was interested in this part of North America.

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Fig. 27. The Coastal Plain sands of the shores of southern Florida support a large growth of coconut palms. This view shows the clusters of coconuts growing around the trunk of the tree

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Fig. 28. These men are harvesting Indian River pineapples. Pineapple-growing has recently become an important industry in southern Florida. What conditions make fruit-raising profitable in Florida?

Fig. 29. Oranges are the most important of the Florida fruits. Thousands of acres are covered with thriving groves. Some of the groves contain lime and grapefruit trees as well as orange trees

Fig. 30. Tampa, Florida, is situated on the margin of the Gulf Coastal Plain at a point where a small river enters Tampa Bay. This view shows the river and the flat land on which the city is built. The lower channel of the river (at the right) has been deepened to allow large vessels to enter from the bay. Tampa is the chief port of export for the Florida phosphate. The railroad tracks over which the phosphate is carried from the mines to the storage elevators are at the right in this view. Where is this product sent from Tampa? What other products are exported from this Gulf port?

The Atlantic portion of the Coastal Plain, as far south as Florida, is a part of the original territory obtained from Great Britain by the treaty of 1783, following the American Revolution. Florida was purchased from Spain in 1819. Louisiana and Arkansas are a part of the Louisiana Territory purchased from France in 1803, and Texas was annexed to the United States in 1845 (Fig. 191).

Until after the Revolutionary War almost all of the white people in North America lived in southern New England or on the Coastal Plain and Piedmont Belt north of Georgia (Fig. 190). "Piedmont" means *at the foot of the mountain.*

Origin of the plain. The Atlantic and Gulf Coastal Plain was formerly under the ocean. At that time the continental shelf (*see map opposite page 82*) was more than twice as wide as it is to-day. Rivers from the lands brought sands, gravels, and clays to the shore line, just as they are bringing such materials to the seashore to-day. The sands, gravels, and clays thus deposited offshore built up a plain underneath the shallow ocean waters. Later the land rose, the sea retreated, and the Coastal Plain came into existence.

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Fig. 31. This is a common sight along the shores of Delaware Bay. The farmers bring their tomatoes to the wharves in wagons and trucks and load them onto flat scows bound for the canneries at Baltimore. Thousands of tons of Coastal Plain tomatoes are canned every year at Baltimore

The surface soil was enriched by the decay of vegetable matter, and in time this whole region became clothed with plant life and with great forests. Most of the materials which make up the Coastal Plain are soft and loose. Even a boy would have difficulty in finding a stone to throw. Instead of bowlder walls, as in New England, the early inhabitants built picturesque rail fences. In place of marbles, granites, sandstones, limestones, and other hard rocks similar to those that form the Appalachian Highlands, the materials of the Coastal Plain usually consist of loose sands, gravels, marls, loams, and clays.

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Fig. 32. Savannah, Georgia, is the largest market in the country for naval stores. The wharves are crowded with barrels of rosin, tar, and turpentine, ready for export. Where will they be sent?

Delaware Bay, Chesapeake Bay, and the broad inlets farther south are estuaries, or drowned river mouths, due to a late sinking of the coast.

Sand reefs and sand dunes. *Use maps on pages 23, 25, and 35.* Along the shores of the Coastal Plain the waves have built sand reefs which inclose, or nearly inclose, lagoons. These offshore reefs become natural breakwaters. There is one over 100 miles long on the coast of Texas; and in the Carolinas, Cape Lookout and Cape

Hatteras are parts of sand reefs which project as great points into the Atlantic Ocean. Along the New Jersey and Long Island coasts there are also offshore reefs.

The sands washed up by the waves on these reefs are commonly blown into sand dunes, so there is usually a line of low hills bordering the coast.

When a sand reef is formed near the mouth of a river or a harbor, the end of it is usually curved. At the opening of New York harbor, Rockaway Beach on Long Island and Sandy Hook on the New Jersey side are both curved (Fig. 52). The tip end of Cape Cod was formed into a curved reef, or hook, by the work of waves and shore currents. This hook protects the harbor of Provincetown. All the land about Provincetown is sand. The hills here are made of sand blown up by the winds.

Fig. 33. This is a view in the business section of Houston, Texas. The broad, well-surfaced street, wide sidewalks, and fine business blocks are typical of the enterprising cities of the Gulf Coastal Plain. Locate Houston on your map. What are its chief business activities, and why?

Fig. 34. Galveston is built on the end of a sand bar and is open to the full force of the waves from the Gulf. In 1900 the city was destroyed by hurricane waves, and since then this great cement sea wall has been built in order to prevent another such disaster

Coral islands. Along the shore of Florida, where the sea waters are sufficiently warm, corals have grown and made little islands and reefs. Corals grow in clear ocean waters where the temperature does not fall below 68° Fahrenheit and where the depth is not more than 120 feet. We shall find that there are coral animals in the tropical seas all around the earth where there are clear, shallow waters.

Mississippi delta. At the mouth of the Mississippi River is one of the largest deltas in the world. Each year the river brings millions of tons of sediment to the Gulf. If all the material brought in one year were placed on a square mile, it would be nearly 270 feet high.

When the river water meets the still water of the Gulf of Mexico, it loses its velocity and so is forced to drop whatever it is carrying. The deposits appear first as bars opposite the mouth of the river, and the river is forced to divide and form two mouths. This process continues until there are several mouths.

Each distinct mouth is called a distributary. It takes water away from the main stream and thus does a work that is quite different from the work of a tributary.

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Fig. 35. New Orleans is located on a broad bend of the Mississippi River about one hundred miles above its mouth. This view shows part of the city and in the distance the low, flat land of the Mississippi delta across which the river winds its way. Can you explain the origin of this delta? The river channel has been deepened so that the largest ocean steamers can reach New Orleans, making it the most important seaport on the Gulf of Mexico. Locate New Orleans on your map. What are its exports? With what countries does it trade? What are some of its chief imports?

Fig. 36. Here is a view in a Mississippi pecan orchard. The nuts are spread out in trays according to grades and sizes. Nut-raising is a growing industry in our country, in which the South and the Far West lead. Nuts are very nutritious, and their use as food is increasing rapidly

Future. The Coastal Plain is a large region with enough rainfall for agriculture, and with such good soils that it will surely become a more and more important agricultural district. The presence of large supplies of phosphate rock that may be used to fertilize the light sandy soils is most fortunate. The trees should be cared for by trained foresters, and thus the supply of timber and pitch can be made permanent. More nut-bearing trees and more fruits can be raised (Figs. 36, 37, 38). More of the swamp lands should be drained.

Fig. 37. This is a field of Virginia peanut vines. The blossoms come out near the base of the vine and are at once covered with earth. Thus the peanuts develop underground but are attached to the branches of the vine, not the roots. What are the uses of the peanut?

The Mississippi River can be in part controlled and forced to deposit more silts on its flood plain. Thus wet lands are built up and made suitable for farming. Men should learn how to control this river in such a way as to prevent disastrous floods. In this way it would be possible to save some of the rich soils that the river is all the time carrying to the Gulf of Mexico.

The lowlands of Florida are being drained and made available for agriculture. The seaside resorts are certain to become more and more popular as the cities of this country become more crowded. The Coastal Plain will easily accommodate a much larger population, and with intelligent, scientific care the soils will yield greater crops, and all who live there may be prosperous.

The excellent harbors of the Atlantic and Gulf Coastal Plain encourage foreign commerce. With the ever-increasing trade of the United States with the countries of South America, Central America, Mexico, and the West Indies the states of the Atlantic and Gulf Coastal Plain are sure to be greatly benefited.

Fig. 38. A single peanut vine, showing the full-grown nuts and the little nodules on the roots which extract nitrogen from the air in the soil and store it up for food for the vine. When the plant decays, the nitrogen from the nodules enriches the soil

Problems and review questions. 1. How may the absence of hard rocks in the Coastal Plain be explained? 2. What is the reason for the great bays indenting this coast? What is an estuary? 3. How are deltas formed? What proof is there that the Mississippi River made the delta at its mouth?

4. What is the relationship of the continental shelf to the Coastal Plain? 5. How were the sand reefs bordering the coast formed? 6. Explain the presence of sand dunes on many of these reefs. 7. Explain the formation of lakes in the Mississippi River flood plain.

8. Why did the early settlers who came to this coast move inland rather than settle on the shore? 9. Why did they stop and build settlements at the inner margin of the Coastal Plain? 10. Where were some of the early settlements? 11. What is the fall line?

12. Why is this part of the United States an agricultural district? 13. What conditions found here are favorable for raising cotton, rice, sugar cane, citrous fruits, peanuts? 14. What industries have the southern forests developed? 15. In what part of Louisiana has oil been discovered? 16. What European peoples sent exploring parties to this portion of America?

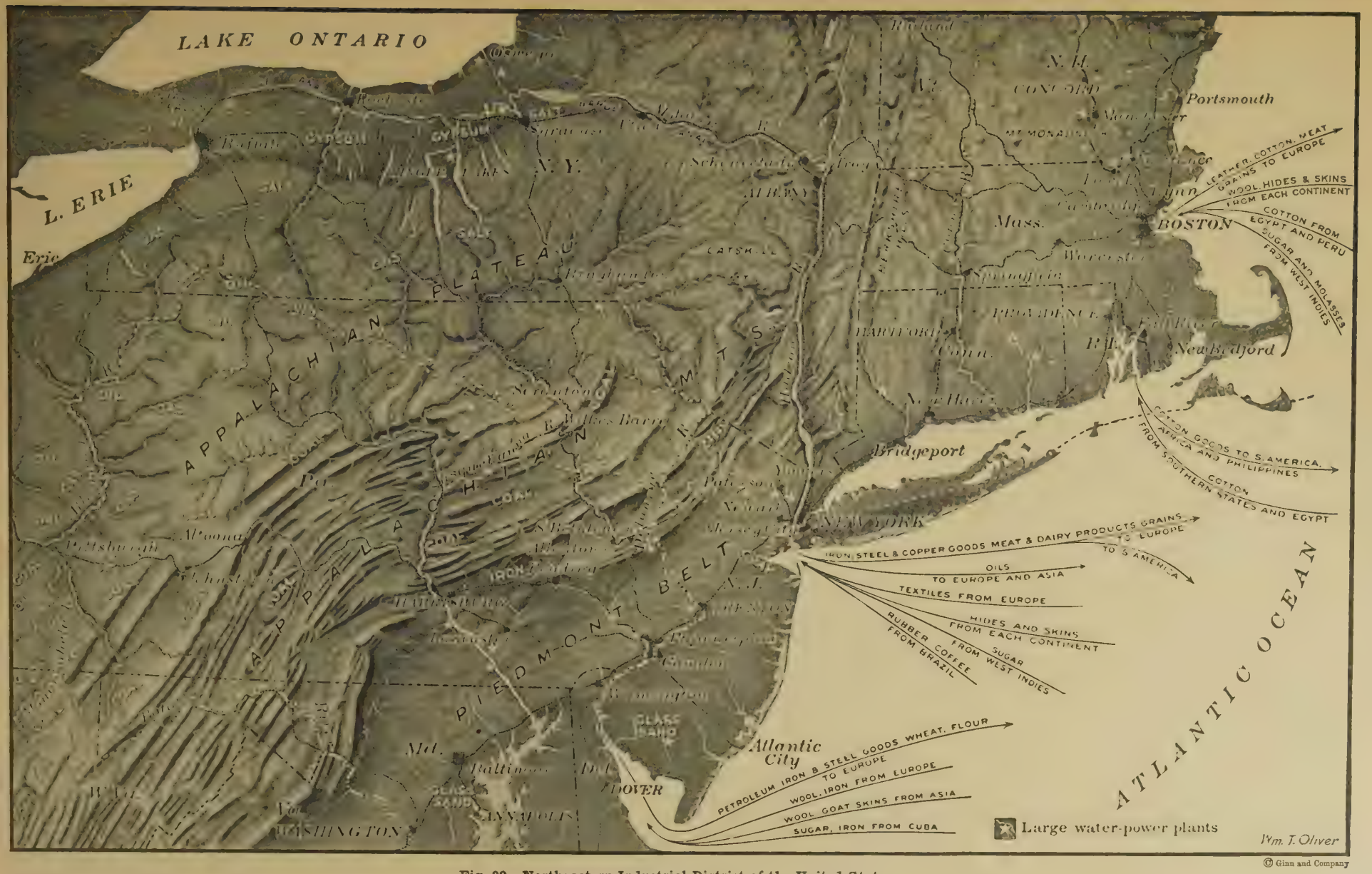

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Fig. 39. Northeastern Industrial District of the United States

Map studies. 1. Through what states on this map does the inner margin of the Coastal Plain pass? 2. Locate the Piedmont Belt. There were mountains at one time throughout this belt, but most of them have been worn down to hills.

3. Locate the Appalachian Mountains. They are long ridges composed of hard layers of rock. The mountains were made when these layers of rock were compressed and folded. Since then rivers have cut away much of the softer rock and thus made broad valleys between the mountain ridges.

4. In the Appalachian Plateau the rocks are like those in the mountains, but in the plateau region they have not been folded.

5. What fuels are found here? Where are they most abundant? 6. What other source of power is here? 7. Where are there great salt deposits? 8. Where is the Barge Canal?

9. There are about 26,000,000 people living within the area shown on this map. What per cent of the population in the United States is that? 10. Make a list of the natural advantages which have led to the busy industrial life in this district. 11. Explain the location of each of the large cities.

MAP STUDIES

North Carolina. 1. What natural regions extend into this state? 2. What mountains form a part of the western boundary? 3. What mountain over 6000 feet high is located in this state? 4. In what natural region are most of the streams navigable? 5. What are the chief agricultural products? 6. Name and locate the capital. It is in the midst of a prosperous farming country. 7. What is the chief seaport of this state? 8. What use is made of the chief imports of this city? 9. Judging from the chief export from **Wilmington**, name the leading crop.

Raleigh is the capital of this state. **Winston-Salem** is the largest city. **Charlotte**, the second city in size, is an important cotton market.

South Carolina. In the extreme northwest there is a little of the mountain area, but most of this state is within the Piedmont Belt or the Coastal Plain. 1. How far inland are the streams navigable? 2. What cities are located at or near the heads of navigation? 3. What is the chief seaport? 4. What are the chief imports? the chief exports?

The phosphate rock in this state is very valuable as a fertilizer, and when it is used on the light, sandy soils of the Coastal Plain, good crops can be raised. Rice is cultivated in the low, swampy lands near the coast. Cotton and tobacco are raised on the Coastal Plain, and cotton is also an important crop in the Piedmont Belt.

Charleston is the oldest and largest city in the state. **Columbia**, the capital, is one of the fall-line cities. It is at the head of navigation on a Coastal Plain river and is an important railroad center.

Georgia. 1. What three natural regions extend into this state? 2. What navigable rivers are available to the people of Georgia? 3. Where do these rivers cease to be navigable? 4. What cities are located at the heads of navigation?

5. Why should they be located in such places? 6. In what region is the famous Georgia marble obtained? 7. What are the chief agricultural products?

Savannah, the chief seaport, is about 18 miles from the ocean. It is the oldest city in the state and one of the leading cities of the United States in the shipment of cotton. In the shipment of naval stores it is first in the world.

Atlanta, the capital, is located in the midst of the Piedmont Belt. This city is a manufacturing and trading center and is rapidly increasing in population. It is one of the most important railroad centers in the South. **Augusta**, **Macon**, and **Columbus**, three important fall-line cities, have the advantage of good water-power and have become cotton-manufacturing centers.

Florida is entirely within the Coastal Plain. 1. What are the chief products of this state? 2. Name and locate the capital. 3. What navigable rivers are there? 4. What products are obtained from the sea? 5. The southernmost city in the United States is in Florida. Name and locate it.

Jacksonville is the largest city in the state. It has the advantage of being a seaport and also of having good railroad connections. It is an important lumbering center and receives large supplies of naval stores. **Tampa** is one of the chief gulf ports and is one of the principal centers of cigar-manufacturing in the United States.

Alabama. 1. What natural regions extend into Alabama? 2. What resources, important to industrial development, are found in the highland region? 3. What is the chief product of the lowlands?

Mobile is an important industrial city and one of the leading Gulf ports. Great quantities of cotton, lumber, and other products are exported from here. **Montgomery**, the capital, is in the midst of a prosperous agricultural district. **Birmingham**, situated in a region rich in coal, iron, and limestone, is one of the two greatest centers of the country in the production of iron and steel and their manufactured products.

Mississippi is entirely within the Gulf Coastal Plain, and agriculture is very naturally the chief industry. 1. What appears to be the leading product? 2. In what portion of the state are pecans raised?

3. Name and locate the capital. This city has excellent railroad facilities and has become a manufacturing center. The forests of the Coastal Plain furnish wood, and the manufacture of woodenware is an important industry at the capital.

Meridian is the largest city in Mississippi and is also a manufacturing center. The manufacture of cotton cloth and the various cottonseed products is rapidly increasing throughout the South. **Vicksburg** is beautifully situated on a high bluff overlooking the Mississippi River. Here the federal government has established a large park in honor of the American soldiers.

Tennessee is the one state in this group without a coast line. 1. What navigable rivers are available to the people of this state? 2. What are the chief resources of the highland region?

Nashville, the capital, is situated in the richest agricultural part of the state. **Memphis** is built on the east bank of the Mississippi River. It is the largest city in the state and the largest river port between St. Louis and New Orleans. **Knoxville** is the trading center for a large district in eastern Tennessee and is a leading industrial city. **Chattanooga** is fortunate in having good railroad and river transportation and in being near to supplies of coal and iron.

GENERAL QUESTIONS

1. Judging from the exports, name the chief agricultural product in these states. 2. Where is much of that product sent?

3. How many rivers in these states are navigable only to the inner margin of the Coastal Plain? Explain this. 4. What are the chief seaports in this group of states? 5. Explain the location of the fruit-producing districts.

6. What large city in South Carolina is in about the same longitude as the Panama Canal? 7. Which is farther west from Greenwich, — Mobile or Chicago?

8. What large city in Louisiana is in about the same latitude as Cairo in Egypt? 9. Notice the latitude or longitude of other cities shown in the margins of this map.

Home work. 1. Make a list of the exports shown on this map. Make another list of the imports. 2. With what countries is most of the trade? 3. On an outline map of the United States, color the boundaries of each state in this group; print in the name of each state; locate and name the capitals.

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MAP STUDIES

Louisiana is entirely within the Gulf Coastal Plain. It is crossed from north to south by several navigable rivers, and the chief cities are all located near the rivers. 1. Judging from the products, name the chief occupations in this state.

2. In what part of the state is sugar the chief crop? 3. What important fuel is obtained in this state? 4. Name a large city located near that supply of fuel. 5. Name and locate the capital.

6. Why is there no settlement at the mouth of the Mississippi River? 7. How has the location of **New Orleans** favored its development? *See also Fig. 35.*

Texas is by far the largest state in the Union. It has great variety in its surface features, climate, and natural resources. In the east and southeast is the Gulf Coastal Plain, where the soils invite the people to undertake agriculture. Except in the extreme south, near the Rio Grande, the rainfall on the Coastal Plain is sufficient for agriculture. The small area of the Central Plains in this state has a rolling surface and is excellent farm land.

The Great Plains are in the semiarid belt east of the Rocky Mountains. Here there are extensive grasslands, and grazing is carried on. In the extreme west there is a portion of the Mexican Plateau within this state. This plateau extends northward into New Mexico and southward into Mexico. It is crossed by mountain ranges.

1. Compare the area of this state with the combined area of all the New England states. Compare it with the combined area of Ohio, Indiana, Illinois, Iowa, and Nebraska. *See tables in Appendix.*

2. In what part of this state would the temperature change least? Where would it change most? 3. What sources of fuel are found in this state? 4. What are the chief food crops? 5. What are the chief exports by water?

6. What products are probably shipped by rail from this state? 7. How many navigable streams are available? 8. Where is the rice-producing belt? the cotton-producing area? the fruit district? the oil fields? 9. What part of the state is sparsely settled? Why?

San Antonio is the chief center of trade in the southwestern part of Texas. The trading is largely in cattle, horses, wool, and hides. **Dallas** is in the midst of the most fertile part of the state. It is a distributing center for agricultural machinery and is also a manufacturing city.

Fort Worth is only 32 miles from Dallas and has grown along with the development in farming and stock-raising in that part of the state. There are large packing-houses and stock-yards in this city. **Waco** is another city that has been greatly benefited by the rapid development of farming in the central part of the state.

Houston is now connected by a ship canal with the coast (Fig. 33). It is one of the largest cotton markets in the world, an important lumber market, and the center of large rice and sugar industries. **Galveston** is the principal seaport of Texas and exports more cotton than any other city in the world. Great quantities of grain are brought from Texas and Oklahoma to this port for shipment (Fig. 34). **Austin**, the capital, is beautifully located on the Colorado River. It is largely a city of residences, although there are some manufacturing establishments in the city.

Oklahoma. In the east and south there are highland areas which include some old, worn-down mountains. The rest of this state is classified as a plain.

In the southeast there is a little of the Gulf Coastal Plain, with light, sandy soils. The Central Plains extend through the middle section. Here the surface is rolling, and the soils are very fertile. Farming is the chief occupation.

In the west the soils are good, but the rainfall is light. This is a region of grasses, where grazing is the chief occupation. 1. What mineral resources are abundant in this state? 2. How are these resources used? 3. What are the chief products of agriculture?

Oklahoma City, the capital, is in the best farming district of the state and near the stock-raising areas. Flour mills, foundries, and machine shops have been erected, and the meat-packing industries of this city are among the most extensive in the Southwest. **Tulsa** and **Muskogee** are near the great oil and gas fields of the state and have benefited by the remarkable development of those fields. The oil is in the layers of rock that underlie the surface of central and eastern Oklahoma.

Arkansas. About half of this state is within the Gulf Coastal Plain, and the remainder is included in the Interior Highlands. The valley of the Arkansas River, between the mountains in this state, is a broad, fertile, and well-watered farm land. 1. What mountains are there in this state?

2. Name the chief navigable rivers of Arkansas. 3. What mineral deposits have been found? 4. What part of the state appears to be a fruit-raising district?

Little Rock, the capital, is fortunate in having good railway and river transportation and in being in the midst of an excellent farming land. The forests of Arkansas are among the important resources of the state, and large lumber mills and wood-working plants have been built at Little Rock. **Fort Smith** is at the western margin of the state and on the Arkansas River. It is surrounded by coal fields and is not far from a large supply of natural gas. These sources of power have led to the development of manufacturing. Among the leading industries are furniture-making and the manufacture of wagons.

GENERAL QUESTIONS

1. What are the chief seaports of this group of states? 2. What are the chief food supplies raised here? 3. What are the leading exports? the leading imports?

4. Is New Orleans or St. Louis farther west from Greenwich? 5. What large cities in Texas are in about the same latitude as San Diego, California, and not quite as far from the equator as Atlanta, Georgia? 6. Is any part of Texas as near the equator as Key West, Florida?

Home work. 1. Place on an outline map the larger cities that are located at the inner edge of the Coastal Plain; those at the outer edge. 2. On an outline map of the United States, color the boundaries of each state in this group; print in the names of the states; locate and name the capitals.

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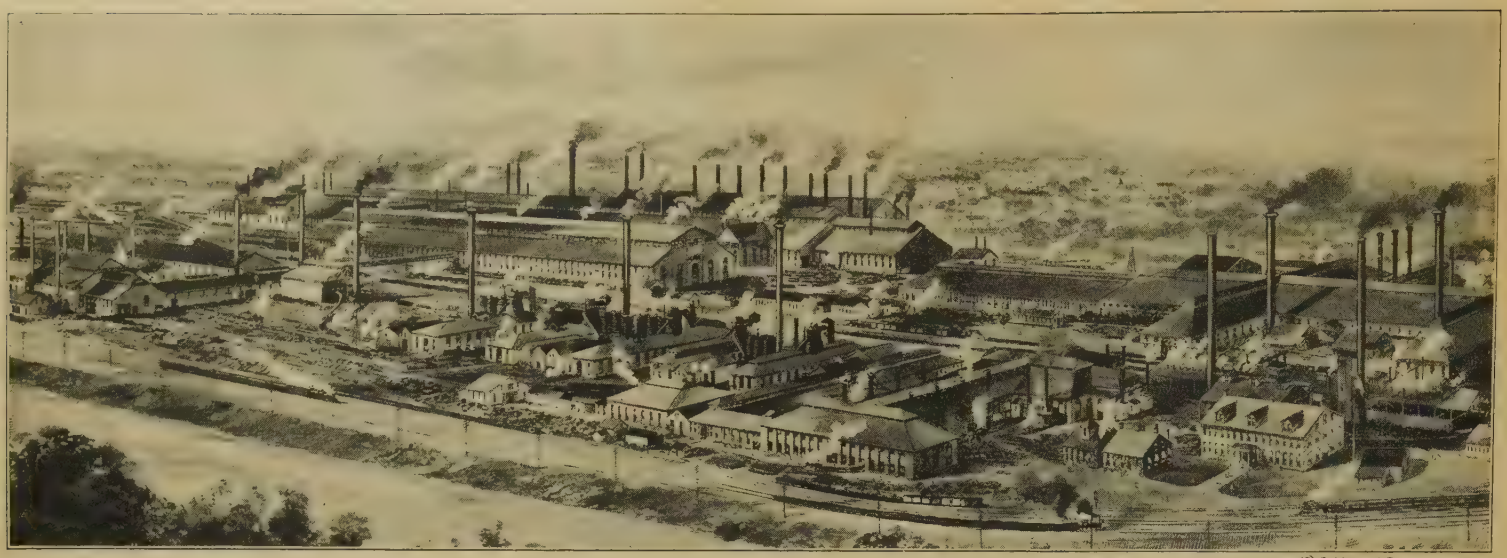

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Fig. 40. These are the great steel works at Bethlehem, Pennsylvania, where iron is made into hard, strong steel. The making of steel is one of the most important manufacturing industries in our country, for without steel very little manufacturing, building, or transportation would be possible. Steel is necessary for all kinds of machinery; farmers must have implements made partly of steel; great buildings need strong steel frameworks; locomotives and automobiles must have many steel parts. In what ways does the manufacturer depend upon the miner, and the miner upon the farmer?

SOUTHERN DIVISION OF THE APPALACHIAN HIGHLANDS

We shall open the study of this region by examining several maps.

MAP STUDIES

(*Use map on pages 2 and 3 and refer also to maps on pages 13, 23, and 35*)

1. This division of the Appalachian Highlands extends from the Hudson River to central Alabama. How far is that? *Use map scale.* 2. What are the mountain and plateau subdivisions of this region?

3. Where is the Blue Ridge? 4. Where are the Catskill Mountains? Of what plateau are they a part? 5. How high is Mount Mitchell, North Carolina? Is Mount Washington, New Hampshire, as high? 6. North of Virginia, which way does the drainage go from the Appalachian Mountains?

7. Which way does it go from the southern part of the Appalachian Mountains? 8. What are the larger rivers in the northern part? in the southern part? 9. What states are within or partly within this division of the Appalachian Highlands? 10. What natural regions border the Appalachian Highlands?

Home work. 1. Select any pictures you have of this part of the country and bring them to school. 2. Write brief studies of your pictures, like those under the views in this book.

An industrial region. This division of the Appalachian Highlands is a great industrial region. It is one of the busiest sections of the United States. It includes the densely populated districts in New York, New Jersey, and Pennsylvania, and extends southwestward to the industrial section of northern Alabama. Locomotives, steel rails, steel vessels, warships, guns, and munitions are manufactured here on a large scale (Fig. 40). The Delaware valley has become the greatest shipbuilding district in the world. Most of the steel trusses for the bridges and the steel beams for the great skyscrapers are made in this region, as well as all kinds of heavy hardware.

Mining and lumbering are very important occupations in this part of the United States, and in places much of the wood of the forests is made into pulp which is used in making paper. Most of the cities are manufacturing centers.

Natural Resources

Sources of power and raw materials. There are large supplies of coal, oil, gas, and water-power in this region. These are sources of power, and man must have power in all manufacturing pursuits.

Iron is found in the Appalachian Mountains and in the Adirondacks, and great quantities are brought from the Lake Superior district.

There are many seaports, many waterways, and a network of railways (Figs. 42, 43). Raw materials are readily brought to this region, and manufactured articles are easily shipped to all parts of the world.

To understand the great development of the industrial life in this region it will be necessary, as well as interesting, to study certain of the natural resources upon which it is dependent.

Coal is found in the ground, usually in great layers. If mining men know that coal is to be found deep below the surface, they sink a shaft (which is like a well) into the ground until they reach the coal seam. Then the coal is broken out and brought to the surface. Little by little the men underground take out the coal under acres or square miles of the land, while the surface of that land is perhaps being used for agriculture (Fig. 41).

The coal resources in this region, and farther west in the great Mississippi Valley, underlie thousands of square miles. The United States is wonderfully fortunate in having such vast quantities of coal.

Natural oil and gas. When indications of oil or gas are noticed, deep holes are bored into the ground; and if there is oil or gas there, it will come toward the surface through pipes that are put down as the boring proceeds.

Gas is commonly used as fuel or for lighting purposes. Natural oil, or petroleum, furnishes a large number of useful products. As it comes from the ground it is usually a thick, dark-green substance. When it is heated, naphtha and gasoline are driven off as vapors and may be condensed into liquids. Kerosene is another product. Our common oils for machinery come from petroleum. Vaseline is one of the products, and also paraffin, which is used in making candles.

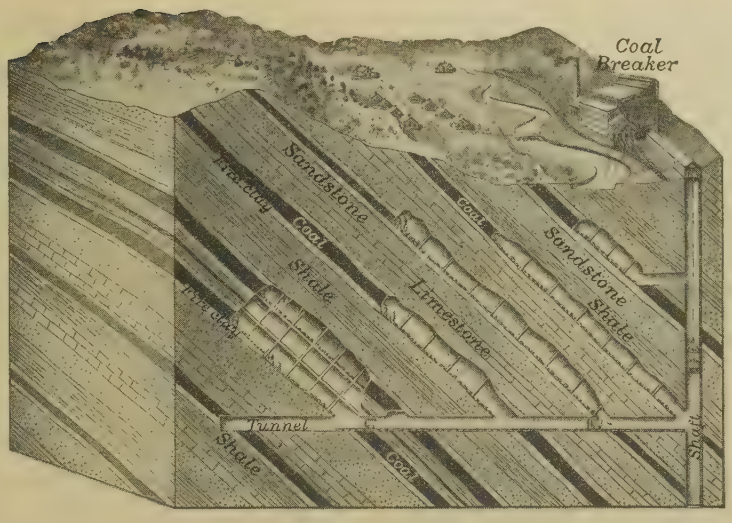

Fig. 41. The layers of sandstone, shale, limestone, coal, and fire clay shown in this drawing were nearly horizontal when they were made, but they were all upturned when the Appalachian Mountains were formed. The rain and the rivers wore away some of the surface, and men discovered the seams of coal. Then the men dug a deep hole, or shaft, and drove tunnels that crossed the layers of coal. Now the miners can easily break out the coal and let it drop into small cars that are taken to the shaft and lifted to the surface. The fire clay is also mined. In coal fields away from the mountains the layers of coal are usually horizontal

Water-power. In addition to the fuels as sources of energy there is a remarkable amount of water-power in this region. The map on page 21 shows where a number of the large water-power plants are located. The waterfalls in the northern part of the district are due to the changes in drainage, caused by the glaciers, just as those in New England were caused (p. 10). South of the land of glacial action (*see map, p. 21*) water-power is developed where streams have hard rocks in their channels and are having a difficult time to cut them away. In such places falls and rapids occur, and there men construct dams and put in power plants.

Sometimes the force of the falling water is used directly to turn mill wheels and thus keep machinery running. Often the falling water turns wheels that generate electricity. This is changing or transforming one kind of energy into another. Such plants are called hydroelectric plants. The electricity is a very convenient form of energy and may be used for the benefit of man in many different ways.

Salt and **gypsum** are found at a number of places in New York State (Fig. 73). The salt is far below the surface and is a great layer of rock. The gypsum is also a layer of rock, but it is nearer the surface than the salt. These deposits are a proof that there were formerly inland seas in this part of North America. When the seas dried up the salt and gypsum that had been in the water were left.

Map and picture studies. *Use the maps on pages 23 and 35.* 1. Make a list of the resources that man gets from the ground in the Southern Division of the Appalachian Highlands. 2. Which ones, when used, are gone forever?

3. Which ones may be used more than once? 4. Study Fig. 41. 5. Where is iron shown on these maps? 6. What building stones are shown? There are other excellent building stones in this region.

Home work. 1. Find out how coal was made. 2. Find out how coke and other valuable products can be obtained from coal.

Fig. 42. Here is a section of one of the great railroads of the state of New York, where six tracks run parallel to one another. Above each track is the signal which tells the engineer whether to go ahead or to slow down. If it is upright, the track is clear; if it is down, there is a train ahead

Fig. 43. The electric engine is fast coming into use on our modern railroads. It makes traveling far cleaner and more comfortable and is easier to run than the steam engine. It carries no coal car and needs no stokers. How will the increased use of hydroelectric power affect railroading?

Fig. 44. This little girl is feeding the chickens on a government experiment farm in Maryland. Our government runs many experiment stations in order to discover the best farming methods

Fig. 45. These little kids live on the same farm. Goats are not very common in the United States, and the government is experimenting to see whether goat-raising would pay the farmer

Fig. 46. These are the fine, strong oxen which are used in the mountainous parts of the Southern Appalachians for hauling logs in places where railroads have not been built as yet

Soils. Soils are of the greatest importance to a community, and it is wise conservation to keep up their fertility. For this purpose special nitrogen-fixing crops (Fig. 38), such as clover and alfalfa, or soy beans and peas, may be planted, and fertilizers may be used. The continuous prosperity of our nation will depend more upon the fertility of our soils than upon any other one of our natural resources.

In the northern portion of this region (including most of New York State), the northern part of New Jersey, and a little of Pennsylvania the soils are of glacial origin. *See map on page 21.* The glacial soils vary because they are made of different kinds of rocks, which were ground up, or pulverized, by the movement of the glacier; some are stony, some are heavy clays, others are sandy and gravelly, but most of them are fertile soils.

South of the line of ice action the soils were made during long periods of rock decay (Fig. 48). Those periods were probably millions of years in length. Each time that the rocks are heated by the sun and then cooled they expand and contract and thus are weakened. Each time that water freezes in the cracks of the rock it expands and opens the cracks a little more, just as the formation of ice may break a bottle or a pitcher. Each time that a root gets into a crack and grows it helps to widen the crack, and sometimes roots of trees break rocks. As plants decay and as animals burrow through the loose material the soil becomes finer and finer until a surface loam is made.

Forests. *See Figs. 49, 50, and 51.* The soil in a forest is loose and porous, and much of the rainfall easily sinks into the ground. Thus there is less water to rush down the hillsides and cause floods. The water which sinks into the ground percolates through the soil and gradually finds its way into the streams, thus preventing them from drying up. In the shade of the forest also the surface water evaporates slowly. Thus droughts are prevented. In portions of this region where the forests have been removed from the mountain sides heavy rainfalls often cause disastrous floods. At other times droughts occur because the rain waters, instead of sinking into the ground, have poured down the hillsides and been lost.

Fig. 47. Dairying is very important in the Southern Appalachians. The great round dairy barn in which this herd of cattle lives will hold four hundred and fifty cows. In the center of the barn is a big silo, in which one thousand tons of green feed can be stored for the cows to eat in winter

Fig. 48. This is a farming scene in a part of the Southern Appalachians which is south of the glacial line. Notice the careful way in which the soil has been rolled and left in clean, even furrows, ready for planting the seed. How have the soils in this part of the region been made?

Fig. 49. In the mountains of South Carolina and Georgia the lack of snow makes it impossible to haul the logs from the lumbering districts on sleds. Instead they are often taken out over narrow-gauge railroad lines. In this view the great logs are being loaded onto the cars by a steam crane

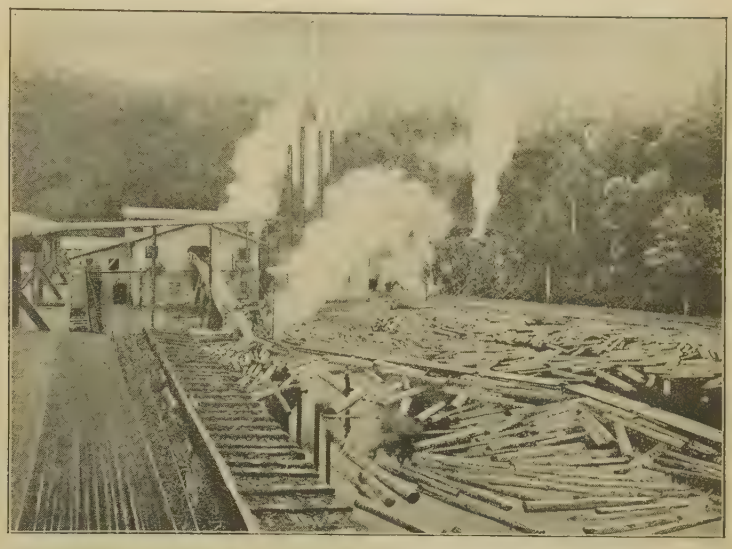

Fig. 50. When the loaded cars reach the sawmill, the logs are rolled off into the log pond. At the left in this picture you can see the track on which the log cars run, and at the right the floating logs which will be sawed into boards in the mill. Why should we preserve our forests?

The roots of the trees help to bind the soils and keep them on the mountain slopes. The presence of the forest, therefore, is beneficial in many ways, in addition to supplying lumber, wood pulp, and pitch.

To-day there are national forests in the southern portions of the Appalachian Mountains. The government has purchased thousands of acres, where trees will be planted and cared for by trained foresters.

Climate. The prevailing winds throughout this belt come from the southwest, and many of the storms that pass over the country come from the southwest and move northeastward. Some storms come from the west or northwest and then change and move northeastward.

In the higher mountains the rainfall amounts to over 60 inches a year, but in the lower portions of the country the annual rainfall is from 40 to 50 inches. Heavier rainfall in the higher mountains is due to the fact that the winds coming to these mountains must rise to such elevations that the water-vapor in the air is cooled and forms tiny drops of water that float in the air as clouds until the drops become too large, when they fall as rain. The rainfall in this region is sufficient for all agricultural uses and for domestic and industrial purposes. The water-power is chiefly dependent upon the heavy rainfall in the mountains.

Courtesy of the U. S. Forest Service

Fig. 51. These men are fighting a forest fire in the Southern Appalachians. Fires of this kind are usually started through carelessness, and they destroy millions of dollars' worth of timber each year

Location and growth of cities. At the southeast margin of the highlands are the fall-line cities, beginning, at the north, with New York and ending, at the south, with Montgomery, Alabama. *See maps on pages 23 and 35.* Each of these cities is located on navigable waters, and most of them have the advantage of water-power.

Another group of important cities includes those located within the Appalachian Highlands on large rivers; such cities as **Harrisburg** and **Pittsburgh** in Pennsylvania and **Wheeling** and **Huntington** in West Virginia.

A third group of leading cities includes those that owe their location to the presence of some particular natural resources. **Birmingham,** Alabama, is near the iron and coal of the southern Appalachian Mountains, and **Scranton** and **Wilkes-Barre,** in Pennsylvania, are in the midst of the hard-coal field of that state. Many of the cities of this natural region owe their location to the local development of prosperous farming communities.

The business of a manufacturing city may be divided into three parts: (1) the gathering of raw materials; (2) the manufacture of commodities; and (3) the distribution of the manufactured goods. To carry on its business each industrial center demands good transportation facilities to and from the city, and some source of power to turn the wheels of its mills.

The city of **New York** has the largest population of all the cities in the world and outranks all others in export and import trade. Its excellent harbor affords a port for the largest vessels (Fig. 52). Raw materials may be brought from all parts of the world to this center, and manufactured goods may easily be shipped to all parts of the world. This location on the seashore, therefore, is one of the most desirable places in the United States for a city. In addition, New York has the advantage of being at the mouth of an important river. Northward from New York is the busy highway of travel through the valley of the Hudson, and equally important is the valley of the Mohawk, leading westward from Albany. By the Hudson-Mohawk route supplies of raw material for manufacture, and great quantities of food, are brought from the rich agricultural lands of the interior.

During the French and Indian War and the American Revolution the valley of the Hudson was a center of great struggle, for its possession by an enemy meant the separation of the only two thickly settled districts of America and the isolation of New England (Fig. 39).

In addition to its commercial advantages, New York is but a short distance from a large supply of fuel. From the Appalachian fields coal and oil are quickly and easily brought to the city for use in the large factories.

The leading industries in New York are the manufacture of clothing and machinery, printing and bookmaking, meat-packing, and the refining of sugar. New York has become the leading financial center of the world. There are many banks and insurance companies with large capital, and most of the great industrial houses of America have offices in the city (Fig. 53).

The borough of Brooklyn developed as a large independent city across the river from New York City, but it has now become a part of the metropolis. It is an important center for the refining of sugar and the roasting and grinding of coffee and spices.

Eastward from Brooklyn and northward along the banks of the Hudson River are chains of suburban towns where many of the people live who work each day in the metropolis.

To the west, across the Hudson River, are Hoboken, Jersey City, and Newark. These three cities are in New Jersey, but they have many of the same great geographic advantages that New York City has.

In addition to the busy industrial and commercial life of the city, New York is one of the leading educational and musical centers of this country, and it is fortunate in having wonderful collections of natural history and of art.

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Fig. 52. This is an aëroplane drawing of New York City and its surroundings. The city originally occupied only the island of Manhattan, at the mouth of the Hudson River. Trace the outline of the island in this view. The city of New York now includes the five boroughs of Manhattan, the Bronx, Brooklyn, Queens, and Richmond. Locate these boroughs in the drawing. How many people live in this great city? What proportion is this of the population of the United States? *See Appendix, pages viii and ix*

Picture study. Study Fig. 52 carefully. 1. What natural advantages has New York as a port? 2. Describe the kind of country around the city. Using this aëroplane view, with Fig. 39 and the map on page 35, answer the following questions: 3. To what natural region do Staten Island and Long Island belong? 4. In what natural region are Manhattan Island, Jersey City, and Newark located? 5. In what state is Sandy Hook? 6. Why should there be sand bars near the entrance to New York harbor? 7. What great natural highway leads northward from New York? 8. Why is most of the trade between New York and the West carried on over this highway rather than over a direct route from New York to Chicago? 9. What industrial cities other than New York are shown in Fig. 52? 10. Where do they get their raw materials? their fuel?

Fig. 53. This view shows the lower end of Manhattan Island as it appears from the west bank of the Hudson. This is the business and financial center of New York City, and the office buildings are commonly known as sky-scrapers, because they are so high. The waterfront here is lined with long piers which jut out into the river. Between them are the deep-water docks, which receive the largest ocean liners. How is the general shape of New York favorable to shipping? What are its principal exports? With what countries does New York trade chiefly? What are some of its imports?

Yonkers is situated on the Hudson and is a very important industrial and residential city.

Albany, the capital of New York, is near the head of tidewater on the Hudson (Fig. 54). To the west is the Mohawk Valley, with the Erie and Barge canals; to the north is the Champlain Valley, leading to Canada; to the east is the best route to Boston; and to the south is the Hudson Valley route to New York. Albany is at the crossing of great trade routes. *See map on page 21.*

Troy is located at the head of steamboat navigation on the Hudson River and near the eastern end of the New York Barge Canal. It is famous for the manufacture of collars, cuffs, and shirts.

Schenectady, on the Mohawk, manufactures electrical supplies and locomotives (Fig. 55).

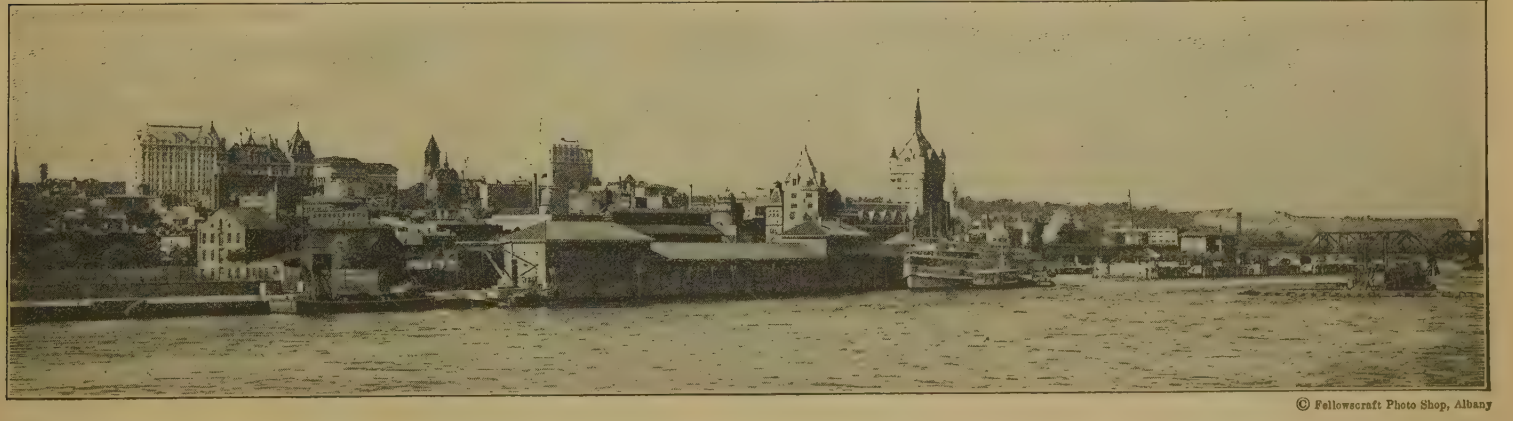
Utica is another Mohawk River city; it is one of the leading knitting and cotton mill cities in the country.

Syracuse was located near certain salt springs which have led to the manufacture of soda products. Railroad trade-routes and waterways have led here to the growth of manufacturing. Many automobiles and bicycles are made in Syracuse.

NOTE. For other cities in New York State see page 34.

Philadelphia was founded by the famous Quaker, William Penn. The name "Pennsylvania" means *Penn's woods*, and "Philadelphia" means *brotherly love*. Here is the famous Independence Hall (Fig. 58), where one may see the old bell that first rang out the good news that the Declaration of Independence had been signed.

The city is located on the Delaware River and is one of the largest and best seaports of the United States. Before the opening of the Erie Canal it was the first city of the country (Fig. 56). It now ranks third in size.



© Fellowscraft Photo Shop, Albany

Fig. 54. Albany, the capital of New York, stands on the steep west bank of the Hudson River, 150 miles from its mouth. Approaching the city from the river, you can see the large public buildings on the hill, and below, along the water-front, the docks, railroad stations, and river boats. Albany is an important railroad center. At the right in this view is the bridge over which all trains from the east must pass to enter Albany. Locate this city on the map on pages 96 and 97. How many transportation routes can you trace which pass through Albany or have their terminals there?

Iron and coal are not far away, and Philadelphia has become an industrial center. More locomotives are made here than in any other city. The chief exports come from the great natural resources of Pennsylvania. The wheat and flour shipped from Philadelphia come by rail from the fertile fields of the interior of the continent.

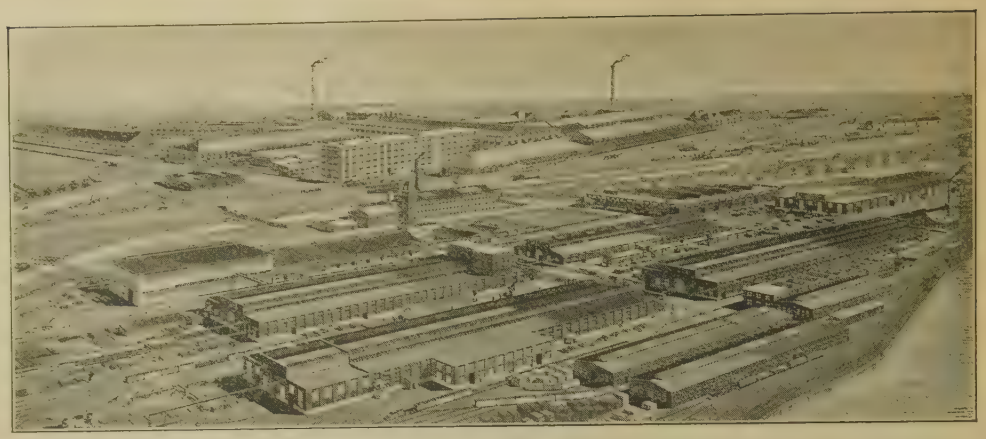


Fig. 55. This is a great locomotive-manufacturing plant at Schenectady, New York. Its buildings cover acres of land. Schenectady is the center of the locomotive-manufacturing industry of New York; the state produces about one fourth of the locomotives of the country. What are the essential materials for this industry? Where do the locomotive manufacturers of Schenectady get them?

Washington and the District of Columbia are very near the falls of the Potomac, but Washington was not located for industrial or commercial purposes. A more detailed description of the capital city, its location and its buildings, will be found on page 101.

Pittsburgh. The early routes of westward migration led settlers to the headwaters of the Ohio River in western Pennsylvania. *See map on pages 2 and 3.* Here, at the junction of the Allegheny and Monongahela rivers, the city of Pittsburgh stands to-day (Fig. 57). In the year 1753 George Washington, then a young man of twenty-one, was sent to warn the French away from the Allegheny valley. He reported that the point where the Monongahela and Allegheny rivers came together was a very favorable situation for a fort. Accordingly, in 1754, the British began to build a fort there, but before it was finished this was seized by the French and given the name Fort Duquesne. The following summer Washington tried to retake the fort. This attempt resulted in the beginning of the French and Indian War, which ended in the withdrawal of the French from the territory and the renaming of Fort Duquesne after the great English statesman, William Pitt.

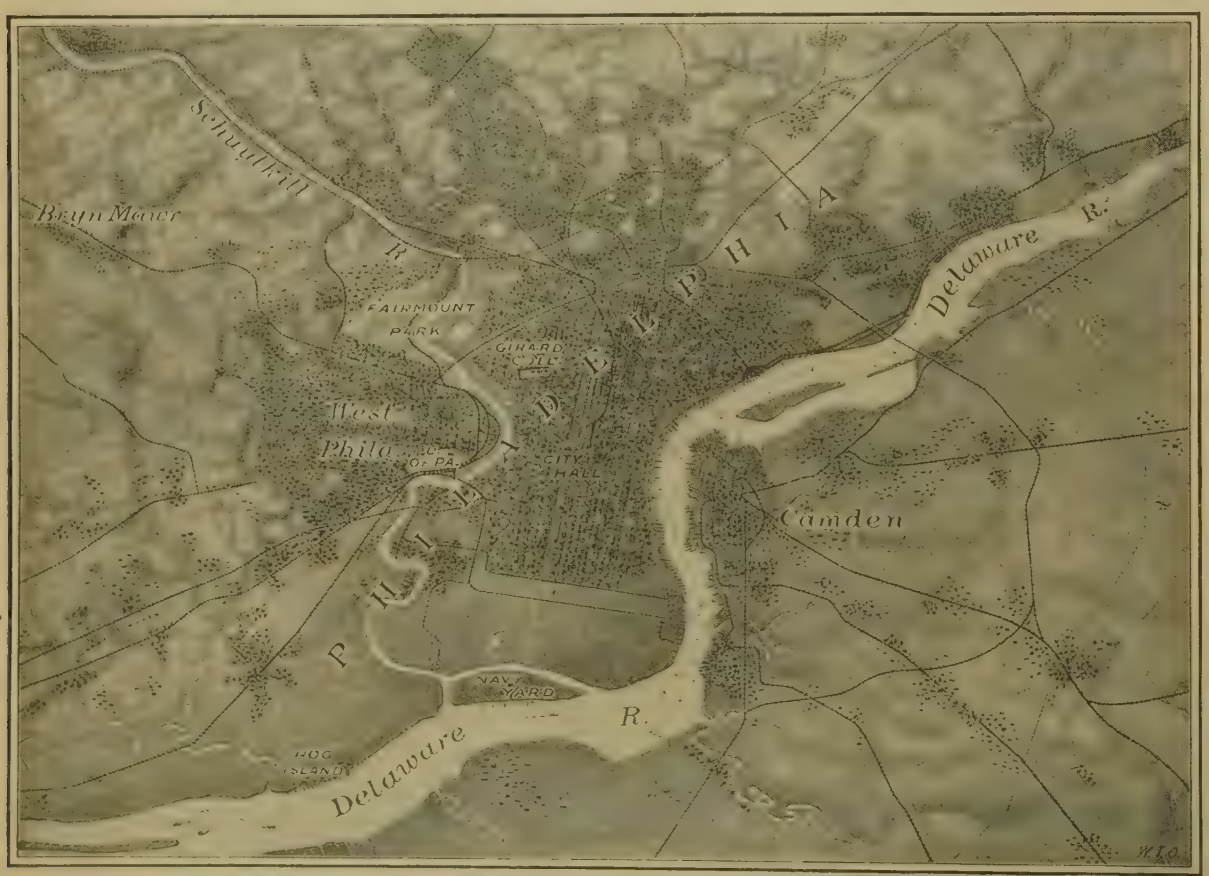


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Fig. 56. The beginning of the city of Philadelphia was made at the falls of the Schuylkill River, where it tumbles down from the hilly country of the Appalachians to the level Coastal Plain. As the city gradually grew in size it came to occupy all the land between the Schuylkill and the Delaware, and to-day the larger river is much the more important. Its channel has been deepened so that large ocean vessels can reach Philadelphia, and twenty miles of wharves along the river front make it possible for hundreds of ships to dock here at one time. For this reason, although Philadelphia is one hundred miles up the river from the sea, it is really a seaport and has a large foreign trade. This aëroplane view shows parts of two different natural regions. What are they? How do they differ in appearance? What are the chief exports of Philadelphia? Where do they come from? Where are they sent? What is imported in return?

The water routes made this site favorable for the location and growth of a large city. Excellent sandstone for glass-making is found in the Ohio valley, and Pittsburgh is famous for its plate glass

and glassware. Since coal, iron, limestone, oil, and gas were available, Pittsburgh became the leading center in this country for the manufacture of iron and steel. As the iron and steel industries expanded, more iron was required than it was possible to secure in Pennsylvania. By that time the wonderful supplies of iron in the Lake Superior region had been discovered, and these ores are now brought by boat to points on Lake Erie, and then by rail to Pittsburgh to supply its great blast furnaces.

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Fig. 57. Pittsburgh has grown up at the point where the Allegheny and Monongahela rivers join to make the Ohio River. The first settlement was made on the little point of land between the two rivers. From that small beginning the city has grown to the size which this view shows, spreading out over the tongue of land between the rivers and taking in the settlements on the opposite banks. This aëroplane drawing shows the kind of country which you would see if you were to travel through the Appalachian Plateau. Can you describe it? Why was this spot a natural place for a city to grow up? What are the important resources of the region around Pittsburgh? What are the chief industries of the city? How does it rank in population among the cities of the United States? *See tables in Appendix*

The city enjoyed a most remarkable development while railroads were being built throughout the United States. The iron and steel industries made possible the rapid construction of railroads, and thus helped Pittsburgh to grow. Later the introduction of steel skeletons for the great office buildings, the use of steel in making freight and passenger cars, and its substitution for wood in a thousand other ways brought a great amount of business to this center of iron and steel manufacture.

Scranton and **Wilkes-Barre** are in the midst of the chief field of hard coal in the United States. Iron and steel are available, and with their supply of coal these cities have become industrial centers. **Reading** is beautifully located on the east bank of the Schuylkill on the margin of the Appalachian Mountain belt. It is a busy manufacturing city, specializing in cotton and woolen goods and boots and shoes. **Harrisburg**, the capital, is located on the Susquehannah River within the mountain area. Coal, iron, and steel are easily available, and therefore manufacturing has been undertaken.

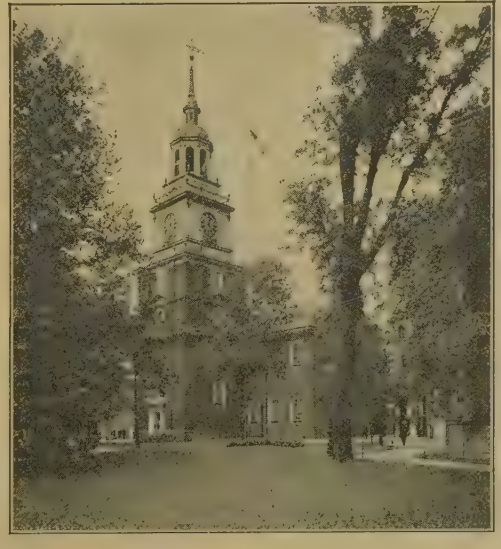

Fig. 58. No building is dearer to the people of the United States than Independence Hall in Philadelphia. Here the Declaration of Independence was signed in 1776 and the United States Constitution adopted in 1787

Baltimore is located on the inner margin of the Coastal Plain. It is within easy reach of fuel and of the iron and steel manufactured in Pennsylvania, and the making of hardware is one of the important industries in this city. Baltimore receives large quantities of tobacco for manufacture. To-day much of the tobacco comes from the West Indies and other tobacco-growing countries in the tropics, as well as from the states to the south and southwest.

Note. For a further study of cities in this natural region see pages 22 and 34.

Rural occupations. In order to learn what the people in the rural parts of this region do for a living, study Figs. 44–48.

MAP STUDIES

(Use also map on page 21)

New York State is very fortunate in having a great variety of surface features, soils, and natural resources. The waterways and water-power are exceedingly valuable.

1. Where is the chief fruit-producing district? 2. What mineral resources are shown in New York? 3. What special reason was there why the people of this state should develop dairy farming and gardening?

Buffalo is at one end of important trade routes from the Great Lakes to the Atlantic, and New York and Boston are at the other ends of those routes. Immense supplies of food and raw materials for manufacture are brought to Buffalo. Power is supplied from the coal, oil, and gas fields of the states farther south and by wire from Niagara Falls. The city has therefore become a manufacturing center.

Rochester owes its start to the water-power at the falls of the Genesee. Later the Erie Canal, the railroads, and recently the Barge Canal, by furnishing good transportation facilities, have helped to make it a prosperous manufacturing city.

NOTE. For other cities in New York State see pages 30 and 31.

Pennsylvania. 1. What natural regions extend into this state? 2. What sources of power are indicated on the map? 3. In what part of the state are the oil and gas fields? 4. The coal in the western part is soft, or bituminous; that in the east is hard coal, or anthracite. 5. What are some of the important agricultural products? 6. What navigable rivers are available to the people of this state?

Agriculture is important, but fully twice as many people in Pennsylvania are engaged in mining and manufacturing as in farming.

NOTE. For cities in Pennsylvania see pages 31, 32, and 33.

New Jersey. 1. What natural regions extend into this state? 2. What mineral resource is found in the mountain belt? 3. What resource has led to the development of the pottery industry? 4. What source of power led to the location and helped in the growth of Trenton? of Paterson?

Newark is the largest city in the state. It is a manufacturing center specializing in patent leather, jewelry, paints, and thread. There are many large copper smelters here. **Jersey City** enjoys the advantage of New York harbor. It is a busy manufacturing city. **Paterson** leads all American cities in the manufacture of silk.

Trenton, the capital, is situated on the Delaware River. It is a fall-line city and the center of the pottery industry of the Atlantic coast. **Camden,** opposite Philadelphia, is an important shipbuilding center. Many who work in Philadelphia have their homes in Camden. **Atlantic City** is one of the most attractive seaside resorts along the New Jersey coast.

Delaware. 1. What natural regions extend into this state? 2. What coal and iron fields are accessible to Wilmington? 3. What advantages has this city in transportation routes? **Wilmington** is located where two small streams from the upland hilly belt have rapids in their courses and furnish water-power. It is a fall-line city and the most important industrial center in Delaware. Its population is about one half of that of the state. 4. Locate on the map the canal which connects Delaware and Chesapeake bays. 5. What fruit from Delaware is best known? 6. **Dover,** the capital, is centrally located in a good agricultural region.

Maryland. 1. What natural regions extend across this state? *See map on pages 2 and 3.* 2. What sources of power are there in the state? 3. What are the chief crops of the lowland area? 4. What industries do the shallow salt waters of Chesapeake Bay encourage? 5. What is the chief seaport of this state? 6. Opposite the mouth of Chesapeake Bay the imports and exports are shown. With what countries is most of the trade carried on?

Annapolis is beautifully located on the shores of Chesapeake Bay. It is the capital and contains the United States Naval Academy. **Baltimore** (*see p. 33*).

Virginia. 1. What natural regions extend into this state? The soil of the Coastal Plain is light and sandy, suitable for raising fruits, vegetables, and peanuts. 2. What appears to be the leading product of the Piedmont Belt in this state? 3. What important mineral resource is found in the mountain area? The majority of the people in Virginia are engaged in agricultural pursuits. Along the coast and in Chesapeake Bay oyster fisheries are very important.

Richmond, the capital, is a fall-line city. The water-power available is used in numerous large manufacturing industries. **Norfolk** is fortunately situated near Hampton Roads. It receives large supplies of coal from the highland region and has become one of the chief coaling stations for vessels on the Atlantic coast. Norfolk is one of the largest peanut markets in the world.

West Virginia. Agriculture is the chief occupation of the people of this state, and yet West Virginia is very well supplied with mineral resources and forests. 1. What sources of fuel are available? 2. What large navigable river is on the northwest border of the state?

Wheeling is the largest city in West Virginia. It is situated on the Ohio River about 60 miles below Pittsburgh. Large supplies of coal and iron are available, and this city, like Pittsburgh, has become a great manufacturing center. In addition to the iron and steel mills there are large glassworks.

Huntington is another large city in West Virginia located on the Ohio River. It has the advantages of both railway and water transportation. **Charleston,** the capital, is in the midst of one of the greatest coal districts of the state and is surrounded by rich oil and gas fields.

GENERAL QUESTIONS

1. Name three important seaports in this group of states. 2. What food supplies do the coast cities import in large quantities? 3. From what countries do the foods chiefly come? 4. What raw materials are imported for manufacture?

5. What city in Europe is in about the same latitude as New York? 6. Is Chicago farther north than New York? 7. What city on the Mississippi River is in about the same latitude as Washington, D. C.?

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Courtesy of the N. Y. Central R. R.

Fig. 59. This is the Clinton Range in the Adirondack Mountains, one of the most beautiful spots in the eastern United States. The Adirondacks are located in the northern part of the state of New York. Their slopes and summits are covered with dense forests, and scattered among them are beautiful lakes. Are these mountains young and rugged or old and worn down?

Explanation of the physical features. After studying the life in this very busy section of the United States, where so many millions of people live, it is interesting to understand the great physical history of the region.

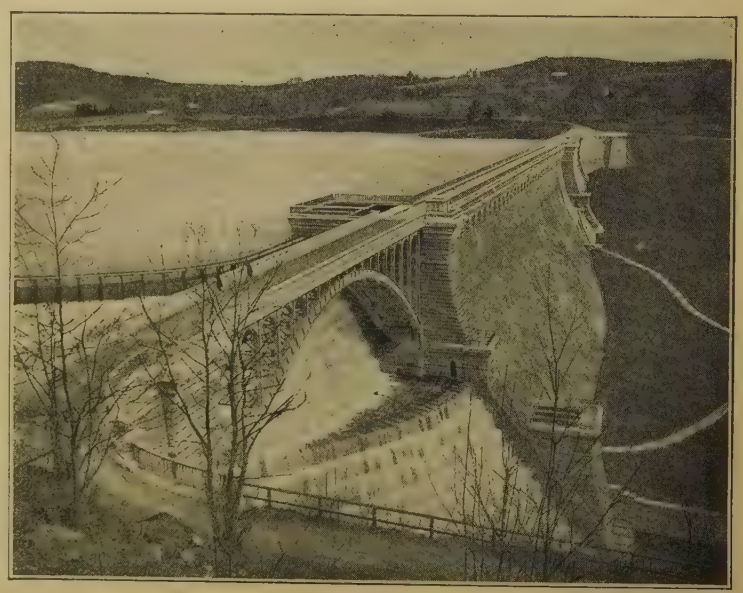
Over much of this part of the United States there was formerly an inland sea. That sea stretched westward from what is now the Piedmont Belt into the present Mississippi Valley. At that time the Piedmont Belt was a mountainous region. Rivers carried sands, gravels, and clays into that inland sea. In shallow, marshy places about the margin of the sea vegetable matter accumulated which later was buried and made into coal; bog iron ores were made; limestones were formed which later were changed into marble; and the deposits of salt and gypsum were left after portions of the sea had evaporated.

Courtesy of U. S. Geological Survey

Fig. 60. This is the famous Natural Bridge in Virginia. It has been carved out of limestone rock by the stream which flows under it. To-day the bridge is 200 feet above the stream

During a long, long period the sands and clays, the vegetable matter, and the iron accumulated on the sea bottom. These deposits came to be thousands and thousands of feet in depth. Then, by means of a great crustal movement in the outer part of the earth, the land was uplifted, the interior sea was forced to withdraw, and a part of the uplifted land was so compressed that the rocks were folded and the Appalachian Mountains were made. The Blue Ridge and Great Smoky Mountains are parts of the ancient land which bordered the inland sea. The ridges in New Jersey, Pennsylvania, the Virginias, and southward into Alabama are made of the upturned edges of great layers of rock formed in that ancient sea.

The next chapter in the history was the wearing down of the land by rivers. Each stream undertook the task of cutting a valley and of carrying some of the land back to the sea. This work is still going on, and the rivers have made wonderfully interesting valleys. The great notches in the Appalachian Highlands, such as the Delaware Water Gap, the one near Harrisburg, and the one at Harpers Ferry, were cut by the streams.



Courtesy of C. P. Berkey

Fig. 61. This is the big Croton Dam near Croton, New York. It is part of the system of waterworks which supplies the great city of New York with pure water from the hilly region along the Hudson River. Why is a good water supply very important to a great city?

Later the same great ice-sheet which invaded New England also covered most of New York State, a part of Pennsylvania, and the northern part of New Jersey (Fig. 39). As in New England, the ice disarranged the drainage and made many waterfalls (which now we look upon as natural resources) and many lakes; for instance, those in the Adirondacks (Fig. 59), the Finger Lakes of New York State, and the beautiful lakes of northern New Jersey. When the ice melted away, a new soil was left over the invaded country. Vegetation

began to grow on these new soils, and when men first came to live here it was a forested or grass-covered region.

The time since the glacier melted away is estimated at about twenty-five thousand years. During that time, or what is called the postglacial period in North America, relatively little has been done, for it is but a short period in the history of this region. Man has caused the chief changes in the landscape since the ice melted away.

Home work. 1. On your outline map of the United States, color in the boundaries of the Middle Atlantic states; print in the names of the states; locate and name the capital of each state. 2. Make a list of at least fifty useful articles made of iron or steel.

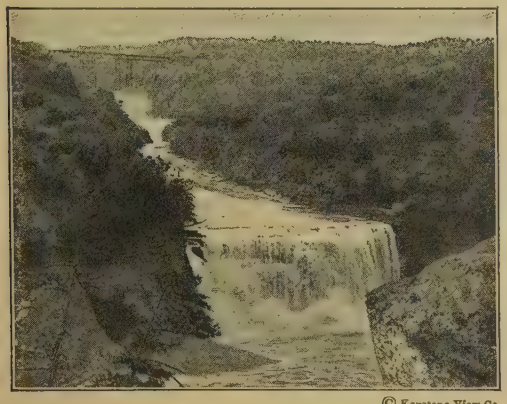


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Fig. 62. These are the middle falls of the Genesee River at Portage, New York. The river drops ninety feet here and offers an opportunity for extensive water-power development

Future. There is no doubt that this region, with its great abundance of natural resources, will become increasingly prosperous. Its many cities will grow larger, greater manufacturing plants will be established, and more railroads will be built. As yet but little of the available water-power is used. The forests should be guarded and their cutting and planting directed by expert foresters, in order that they may become a permanent source of lumber, pulp, tar, and turpentine. We have neglected too long in America the care of our trees. The coal, oil, and gas should not be wasted.

Fig. 63. Lumbering in the Adirondacks is made easy by the winter snows. A great load of logs like this can be brought out of the woods on a sled, which slips over the snow so easily that a single pair of horses can draw it. Contrast this with Figs. 49 and 50

Problems and review questions. 1. What are the three main subdivisions of the Appalachian Highlands southwest from the Hudson River? 2. Why should the central division be mountainous? 3. Why did this region not become principally an agricultural region?

4. What led to the development of manufacturing? 5. What must man do to get natural oils and gases out of the ground? 6. Where are the chief sources of water-power in New York State? 7. Find out all you can about the different uses of gypsum.

8. Why should the Appalachian Mountains have heavier rainfall than the land on either side? 9. What natural advantages has New York City? Albany? Philadelphia? Harrisburg? Pittsburgh? Birmingham? 10. What determined the location of the cities on the southeast margin of this natural region?

11. What influence did the Appalachian Highlands have upon the distribution of settlements in North America before the Revolutionary War? 12. What were the chief lines of westward migration followed by the pioneers through these highlands?

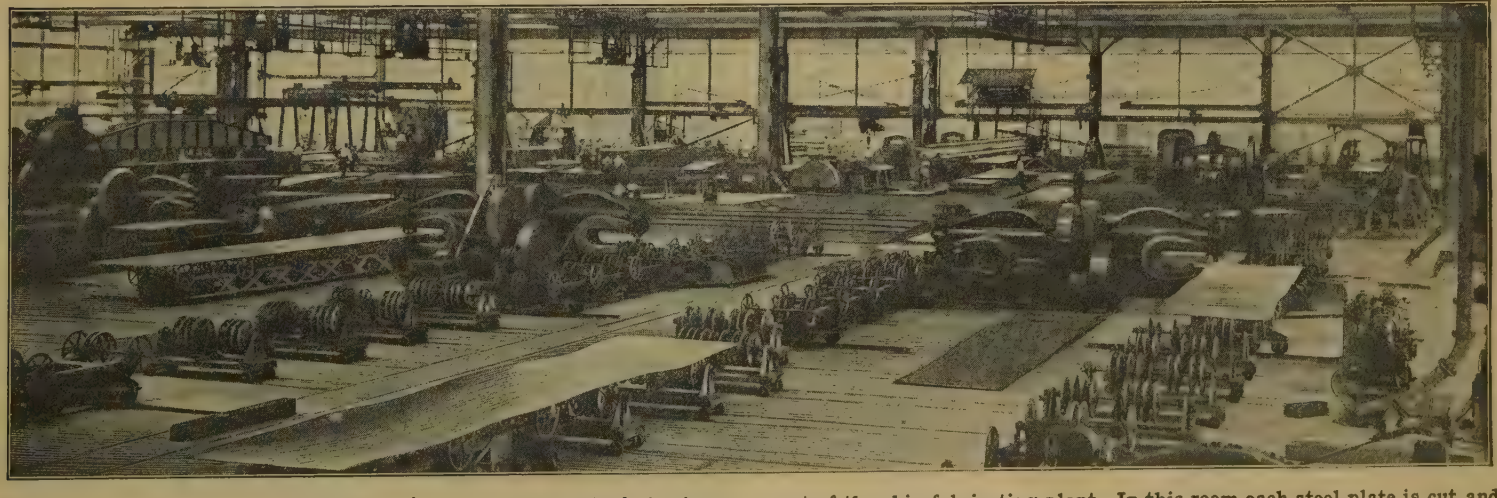

Fig. 64. The iron, coal, and limestone of the southern end of the Appalachian Highlands in Alabama have led to the growth of a great iron-and-steel industry in and near Birmingham. In addition to iron and steel, this district produces all kinds of finished steel products, among them fabricated ships and pressed-steel cars. This picture is an interior view of part of the ship-fabricating plant. In this room each steel plate is cut and shaped to fit exactly into its place in the ship's structure. The finished plates are floated on barges down the Warrior and Tombigbee rivers to Mobile, where the shipbuilding yards are located. Mobile is an important industrial city as well as one of the leading ports of the Gulf coast

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Fig. 65. These men are sorting and packing apples in the famous Ozark fruit region. The Ozark Plateau is especially well fitted for fruit-growing, because it is almost never visited by destructive frosts. Can you explain this? Notice how the man at the left is finishing packing the barrel

INTERIOR HIGHLANDS

Physical features. *Use maps on pages 25 and 55.* In southern Missouri, northern Arkansas, and eastern Oklahoma are the Interior Highlands. They are a westward continuation of the Appalachian Highlands. In the south the Ouachita Mountains are like the Appalachian Mountain ridges, made of the upturned edges of hard layers of rock. The valley of the Arkansas River is just north of these mountains, and still farther north come the Boston Mountains. These mountains have been carved out of a plateau by rivers which have cut their valleys deep into the plateau surface. The St. Francois Mountains in Missouri are composed of very ancient rocks like those in the Great Smoky Mountains in North Carolina. The rest of the region, north of the Boston Mountains, is a low plateau more or less dissected by rivers. It is called the Ozark Plateau (Fig. 65). *See map opposite page 82.*

West of the Ouachita Mountains, and rising above the plains, are two small mountain areas, one known as the Arbuckle Mountains and the other as the Wichita Mountains. In many parts of the country they would be called hills. They rise from 400 to 1500 feet above the surrounding plains, but there are so few elevations in that region that they are called mountains.

This region extends northward to the Missouri River and northeastward to the Mississippi River. The White and Arkansas rivers are the chief drainage lines in the southern portion of the region.

Natural resources and occupations. This region is notably rich in lead and zinc. The mines occur chiefly in southwestern Missouri and northern Arkansas (Fig. 66). The Boston Mountains and the neighboring country to the north are heavily forested, so that lumbering is one of the principal occupations in northern Arkansas.

The Arkansas valley is a fertile farm land bordering the Arkansas River, and many of the smaller valleys are suitable for farming. The raising of fruit has become an important occupation in northern Arkansas and southern Missouri.

Cities. **Jefferson City**, the capital of Missouri, is located at the northern margin of the Interior Highlands and on the Missouri River. **Springfield** and **Joplin** in Missouri are among the more important places, and **Fayetteville**, Arkansas, where the state university is located, is in the midst of a farming and fruit-raising district. **Fort Smith**, Arkansas, is a manufacturing and trading center. Near that city are coal, oil, and natural gas which may be used for fuel.

Future. The future of this region depends chiefly upon the further development of the mining of lead and zinc, and upon agriculture and forestry. The Ouachita Mountains are as yet but sparsely settled. They serve as a grazing land, and perhaps, with the ever-increasing demand for wool, more sheep will be raised there. The large supplies of fuel near Fort Smith and farther west in Oklahoma should encourage an expansion in manufacturing.

Problems and review questions. 1. Name and locate the mountain areas within this region. 2. What are the chief occupations of the people? 3. What further use might be made of the mountainous portions? 4. What large river flows through this region? What other navigable streams are available? 5. What are the chief natural resources? 6. Why is there not a large population in this region? 7. Name the chief cities of this natural region.

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Fig. 66. This is a view of the zinc and lead mines near Joplin, Missouri. At the left is the tall shaft house, which is built over the mine. At the right, the building with the tall chimneys is the smelter, where the lead and zinc are melted and separated from the sulphur in the ores

Wide World Photos

Fig. 67. This is an aëroplane view of the beautiful falls of the Niagara River. On the left are the American Falls and on the right the Horseshoe, or Canadian, Falls. Because they belong partly to the United States and partly to Canada, the two governments have made a treaty regarding the use of the water-power. If all the water flowing over the falls were used, 5,800,000 horse-power could be developed for use in manufacturing. But this would destroy the beauty of the falls, so the two governments have agreed never to use more than one fourth of the available water-power

CENTRAL PLAINS

This is not only a remarkable farming district but it is so fortunate in waterways, water-power, coal, oil, gas, and many mineral resources that it has become a great industrial district. It is one of the busiest regions in the United States.

Location and extent. *Use map on pages 2 and 3.* The Central Plains form part of each of the states of the upper Mississippi Valley and extend eastward into New York State. They extend westward from the Appalachian Highlands, and northward from the Coastal Plain and Interior Highlands, to the margin of the Laurentian Uplands. East of Lake Superior the boundary of the Central Plains region is north of the United States.

Fig. 68. These men are Michigan grape-growers. They raise the sweet Concord and Niagara grapes which are popular throughout the country as table fruit. In what part of Michigan is this industry located? In what other parts of the eastern United States is grape-growing important? Why are these areas near bodies of water?

In traveling westward we do not find a sudden change in the type of country when passing from the Central Plains to the Great Plains. We gradually leave a well-watered region, where general farming is carried on and where there are wood-lots and some forested areas, and come into a country where there is little but broad expanses of grasslands suitable for grazing.

Supplement this study of the map by a careful examination of Figs. 67–91, inclusive.

Climate. The prevailing winds in the Central Plains are from the southwest, and the storms which bring the daily weather changes move eastward over the area. In the southern portion, where the Central Plains extend into Texas, the weather is never very cold; but far to the northwest, in Minnesota and the Dakotas, the thermometer falls to 30 and even 40 degrees below zero during the winter.

Snows are heavy in the northern portion but light in the southern parts. The rainfall, except at the very western margin, is enough for agriculture, and much of it comes during the growing season of the plants. *See rainfall map on page 82.*

The Great Lakes modify the climate by cooling the air that blows over them in summer and warming the air that blows over them in the fall. That is because the lands become heated more rapidly than the bodies of water, and when fall comes they cool off more rapidly than the water. Sometimes the heat that is given off by the water prevents frosts on the lands near by. This is especially true in the southern peninsula of Michigan, and so that part of the state has become a fruit-raising district (Fig. 68 and map, p. 45). The western part of New York State and the northern part of Ohio are also for this reason excellent fruit-producing districts.

Fig. 69. The men in this picture are harvesting the seed of the famous Kentucky blue grass. This grass, which makes excellent feed for stock, takes its name from the bluish color of the seeds before they ripen. The Blue Grass Country is in north-central Kentucky. What are the chief products here?

Natural Resources

Soils. First in importance are the soils. They are fundamental to the prosperity of any people. This extensive area is especially fortunate in having a large variety of very fertile soils. Throughout the greater part of the northern portion most of the soils are of glacial origin. The great ice-sheets (Fig. 14) which invaded the United States covered a large portion of the Central Plains. *See map on pages 2 and 3.* Each time the ice came it brought Canadian soils. It ground up, or pulverized, the rocks as it moved southward, and upon melting left everything that it had picked up on its way.

In the driftless area of the upper Mississippi Valley (*see map, p. 45*) there are no glacial soils, and south of the limit of ice action the Central Plains are without glacial drift. In those parts the soils have been formed by the decay or breaking up of the rock formations. Shale is simply a hardened clay, and when softened and broken up into small particles it becomes a clay again. Limestones also make clay soils. The rich soils of the Blue Grass Country of Kentucky came from the decay of limestones (Figs. 69, 70). When sandstones are broken up fine enough, they make sandy soils. The addition of decayed vegetable and animal matter always helps to make a good soil.

Oil and gas. The chief center for the refining of oil near Chicago is **Whiting**, Indiana. When the oil flows from the ground or is pumped out, it is commonly put into reservoirs or tanks, or started directly through large pipe lines to the centers where it is to be used.

Fig. 70. The rich limestone soils of Kentucky have made it the leading tobacco-producing state in the country. The tobacco in this picture has been cut. After the stalks have been exposed to the sun for a while, they will be carried to large barns and hung up to dry

Oil is pumped through pipes from the Kansas oil fields as far as Chicago,— a distance of nearly 600 miles. The oil from southern Illinois, Indiana, and Ohio is sent in that way to the outskirts of Chicago. Part of the oil of Oklahoma is sent northward, and part is sent southward for shipment from Gulf ports. Much of the Texas oil is piped to the Gulf ports.

The natural gases have long been used as a source of fuel and light in the districts where they are found. When a hole is bored into the rocks where there is gas, the gas will come out freely and must be captured and stored for use. In some portions of the country, where preparations have not been made to save the gas, it has all escaped. Sometimes the escaping gas from wells has become lighted and for many years has burned day and night like a great torch. The gas thus wasted could have brought comforts and even wealth to thousands of people.

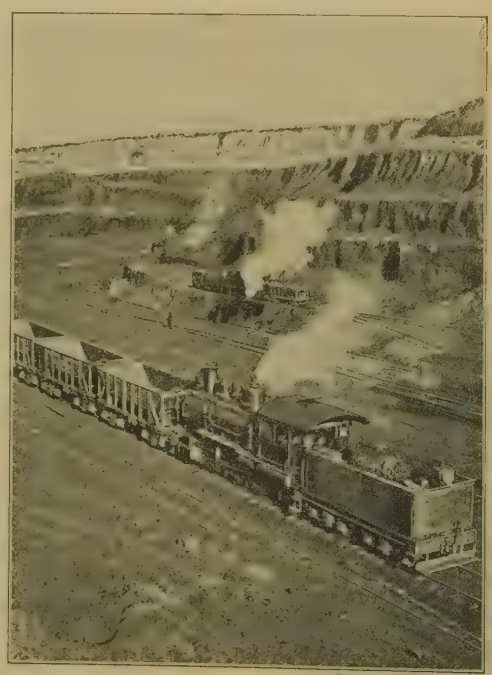

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Fig. 71. In Minnesota the iron deposits are so near the surface that mining consists simply in digging out the ore from the sides of a great pit in the earth and loading it onto cars which are run directly into the pit

Coal and iron. When coal and iron are found near together, manufacturing industries are almost certain to be

developed. This was the case in the Appalachian Highlands, where Pittsburgh and Birmingham are located, and in the chain of cities at the eastern margin of the Appalachian Highlands.

The coal supply in this region is abundant. There are thousands of square miles underlaid with a good grade of soft, or bituminous, coal. At each locality where tests have been made, there is more than one seam or layer of coal beneath the surface.

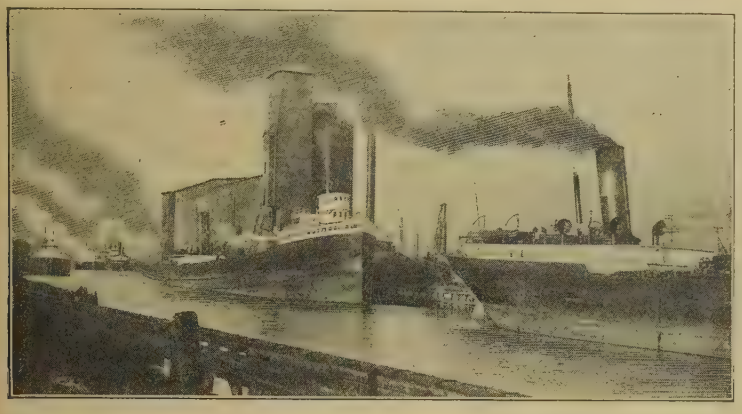


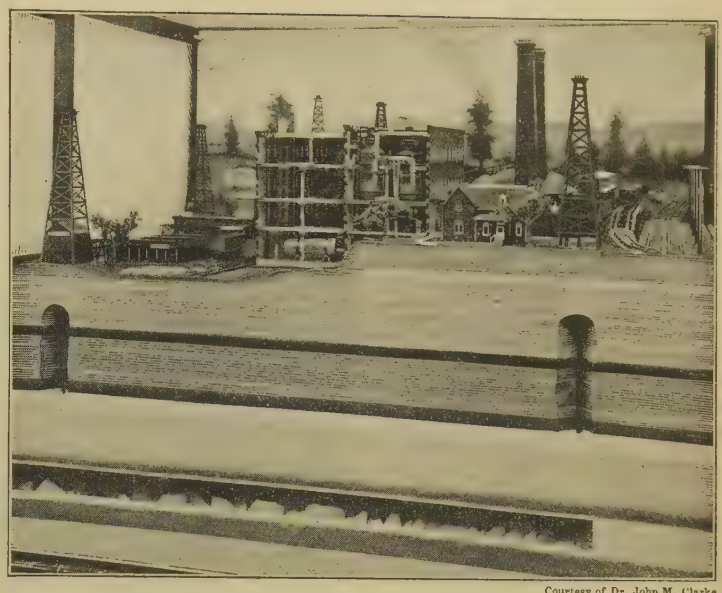
Fig. 72. Along the water front at Buffalo you can see the big lake freighters loading and unloading their cargoes. Hundreds of these freighters are in use on the Great Lakes, running between the eastern and western ports. What products do they carry going east? going west? At what ports do they call?

The iron used in the Central Plains comes from the Laurentian Uplands just outside the region (Fig. 71). The iron is shipped to Milwaukee, Chicago, South Chicago, Gary, Detroit, Toledo, Cleveland, Erie, and Buffalo. Each one of these cities has been greatly benefited by the supply of iron coming by water, and by the nearness of the coal and oil fields.

Copper is brought from the Lake Superior mining district to each of the large industrial cities on the Great Lakes. Some of it is reshipped for use in the more distant Eastern cities.

Lead and zinc. Much of the lead and zinc ores of the Interior Highlands is shipped northward to the vicinity of Chicago. In addition to that supply the Central Plains have a lead-and-zinc-producing district which extends from southwestern Wisconsin into northwestern Illinois.

Lead and zinc smelters are located at **La Salle** and **Peru**, Illinois, where there is coal that is used in smelting the ores. Chicago and the other manufacturing cities of the Central Plains are ready to buy such useful metals as fast as the smelting plants are able to produce them.



Courtesy of Dr. John M. Clarke

Fig. 73. This is a model of a salt-producing plant in New York. The salt is found in a bed 100 feet thick and 2200 feet underground. Fresh water is forced down the pipe beneath the derrick at the right and allowed to dissolve all the salt it can. Then the brine is pumped up the pipe at the left into tanks, where heat is used to evaporate the water. The unrefined salt which is left is then cleaned and purified and finally put into barrels ready for market

Salt has been discovered far below the surface of the ground at several places in New York and in the southern part of Michigan. New York contains some of the most valuable salt mines in the world, and Michigan now produces thousands of tons of salt each year.

Waterways. The Great Lakes furnish the most remarkable continuous route of inland waterways in the world, and are the largest bodies of fresh water (Fig. 74). In St. Marys River, which flows from Lake Superior to Lake Huron, there are rapids; and in the Niagara River there are falls (Fig. 67). The rapids of the St. Marys River are avoided by the two Soo Canals, one on the Canadian side and one on the American side; and the falls in the Niagara River (Fig. 67), that made all travel by boat between Lake Erie and Lake Ontario impossible, are avoided by the Welland Canal. *See map on page 35.* By means of these canals a continuous waterway is provided from Lake Superior to the St. Lawrence River.

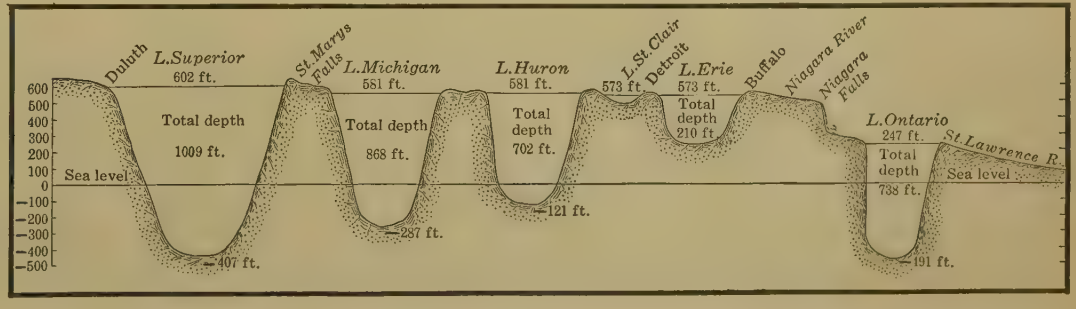


Fig. 74. This diagram shows the total depth of each of the Great Lakes and the height of its surface above sea level. Study the figure carefully. Which lake has the highest elevation above sea level? Between what two lakes is there the greatest difference in elevation? What is the deepest lake? the second deepest? Are all the lake bottoms below sea level? What river carries the lake waters to the ocean?

Portions of the St. Lawrence River are so blocked by rock islands and rock ledges in the channel that canals have been built parallel to parts of the stream. With the help of these canals ocean-going vessels may go directly from the mouth of the St. Lawrence to the westernmost lake ports.

In addition to being of great value in commerce, the Great Lakes provide large supplies of fish and furnish water to many of the cities on their shores. The lakes are a constant source of pleasure to those who live near them or have opportunities to travel upon them. Thousands of summer homes border their shores.

The Mississippi, Missouri, Ohio, and many of their tributaries are navigable. *See maps on pages 45 and 55.* They form a wonderful system of inland waterways that are now used a great deal but should be used more as trade with Central and South America increases.

Water-power. To-day part of the water on the American side of Niagara Falls, and part on the Canadian side, is taken off through great tubes, or tunnels, and made to turn huge wheels. In the power plants these wheels are connected with dynamos so that electrical energy is generated. This energy is not only used near at hand but is sold to consumers many miles away. Some of the power is utilized to run factories and car lines and to furnish light in neighboring cities and towns. Niagara Falls are thus harnessed and made to accomplish a great amount of work for man (Fig. 67).

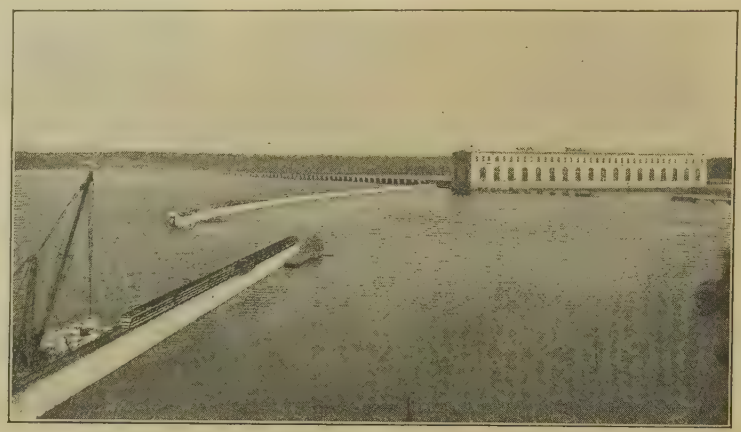


Fig. 75. This is the great dam across the Mississippi River at Keokuk, Iowa. Over 300,000 horse-power is developed here, and of this 60,000 horse-power goes to St. Louis over a transmission line 137 miles long. Why is it wise to harness the rivers of the United States in this way?

The Mississippi River has been dammed at **Keokuk,** Iowa (Fig. 75), and the electricity generated there is transmitted more than a hundred miles to be used for light and power.

Power is also obtained where the waters of the Chicago Sanitary Canal are discharged into the Des Plaines River. By cutting a deep canal the waters of Lake Michigan have been forced to flow southwestward. The canal was cut in order to carry the sewage from the Chicago district into the Mississippi drainage system.

In numerous other places water-power has been employed on a smaller scale, and many more streams can be so utilized.

Forests and their uses. When settlers came into the region of the Central Plains, timber was abundant. Michigan, Wisconsin, and parts of Minnesota were overgrown with forests of soft woods. The southeastern portion of the region had a very valuable forest of hard woods. There still remains a great deal of timber, but the rapid increase in population, with the consequent demand for building material, has led to the destruction of many of the forests. Farmers needed lumber for their homes, barns, and fences, and the building of large cities demanded great quantities of lumber; furniture had to be made; factories and packing-houses required boxes; wooden blocks were used in paving streets; and wood was needed in the making of railway and street cars. To-day other materials are taking the place of wood.

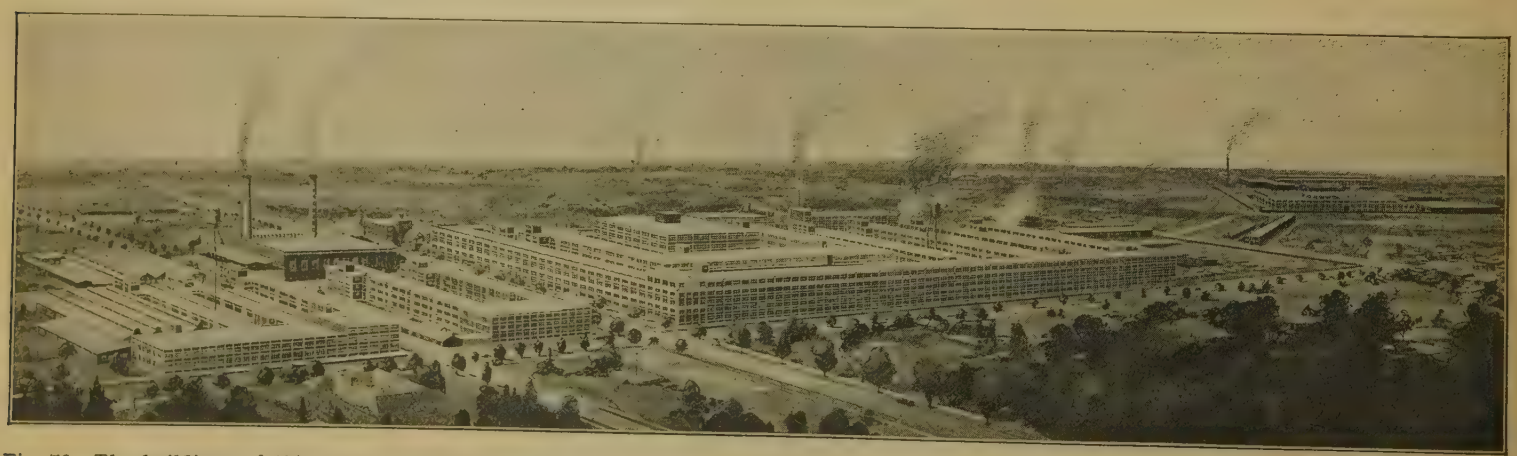


Fig. 76. The buildings of this great automobile-manufacturing plant at Detroit cover 64 acres of ground, and it turns out $40,000,000 worth of automobiles each year. Twelve thousand people get their living by working in the different departments of this great factory. The first modern automobiles were made in France, but the United States now manufactures and exports more than any other country. Detroit is the center of the industry in this country, and the automobiles and motor trucks manufactured here are sent all over the world. Where are the raw materials for this industry obtained?

Grand Rapids, Michigan, owes its development largely to the furniture business. **Chicago** is a great lumber market and also a furniture-manufacturing center. Vessels from northern lake ports bring huge loads of lumber to the docks bordering the Chicago River. The quantities of lumber which were easily accessible to **Detroit** led people in that city to manufacture all kinds of vehicles. When the automobile was invented, plants which had formerly manufactured wagons and carriages turned easily to the manufacture of motor cars, and Detroit has become the chief center of this industry (Fig. 76). **South Bend**, Indiana, was a center to which lumber, as well as iron and steel, could conveniently be brought; and the manufacture of wagons, carriages, and plows has developed there on a large scale (Fig. 77).

Fig. 77. The motor plow is one of the numerous modern agricultural implements which are manufactured in the great cities of the Central Plains for use on the farming lands

But all of this important work could have been accomplished without the destruction of the great forests if care had been taken in the cutting of the trees. Mature and defective trees might just as well have been cut and the others allowed to grow. Scientific conservation of the forests would have meant a permanent supply of excellent lumber.

Building materials. Throughout most of the Central Plains the glacial materials at the surface are valuable in construction work. Sands and gravels have been used for road material, for roof coverings, and more recently in large quantities in concrete construction. Glacial clays have been made into common building brick. There are brick plants which have been turning out thousands of bricks nearly every day for years in order to supply the demand due to the rapid growth of the large cities. The clays have also been used to make tiles (Fig. 78) and terra cotta. There are clays other than those of glacial origin, and there are shales which can be crushed and used as clays in the manufacture of terra cotta.

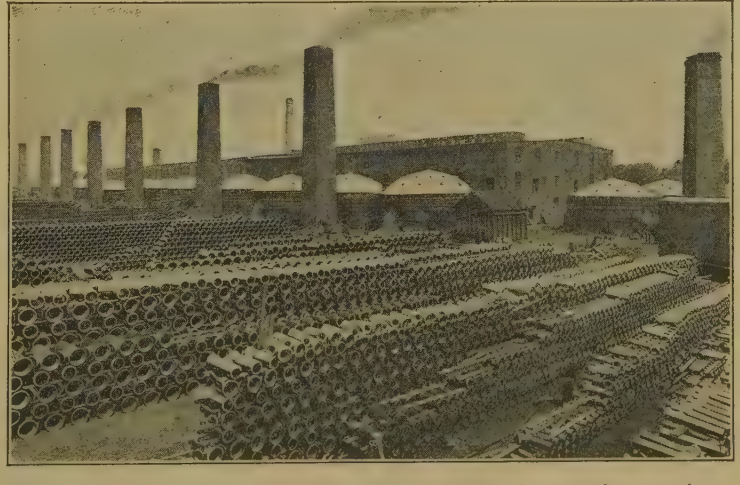


Fig. 78. This is a great plant in Illinois for the manufacture of sewer pipes. The pipes are molded from clay and then put into the kilns and baked until they are very hard. The kilns are the circular buildings with white-domed roofs. Where does the clay for this industry come from?

Limestones, which supply the lime needed in making mortar, are almost everywhere available, and some of the limestones have just the right composition to be used in making cement. The total supply of limestones that can be used in making cement is enormous. This is of great importance since concrete construction has become so common. Limestones are also used in building roads and in laying the foundations of buildings.

At **Bedford**, Indiana, one of the best building stones in America is found. It is a limestone with a remarkable uniformity of color and texture, which makes it possible to carve decorative features out of it. The Bedford limestone is sent to many parts of the United States.

In some places sandstone is ground up into sand and used in manufacturing glass and certain kinds of bricks. Most of the granites and marbles used in the Central Plains must be shipped in from other geographic regions.

Home work. If there is a brickyard near your home, find out where the clay comes from and how it is made into bricks.

Summary of natural resources. This region is a leader in both agricultural and industrial life. Of first importance are the level or gently rolling lands with their rich soils and abundant summer rainfall. Then there are the coal, oil, and gas which furnish heat and power. Next come the waterways and available water-power, the supplies of salt, lead, and zinc within the natural region, and iron and copper from just outside. Add to these the forests, the various building materials, and the ease with which railroads may be built, and it may be truly said that no area of equal size in the world is so fortunate in amount and variety of natural wealth. Under these circumstances it is not strange that so many men have migrated westward from the cities of the East to make their homes and their livelihood in the Central Plains.

MAP STUDIES

Kentucky. 1. What natural regions extend into this state? 2. What part of the state is the roughest? 3. What navigable rivers are available? 4. The central and western portions have excellent soils, and agriculture is the leading occupation in Kentucky. What appears to be the leading agricultural product of Kentucky?

5. What mineral resources in this state are indicated on the map? 6. Locate Mammoth Cave. In this vicinity over 40 miles of wonderful underground passageways have been explored (Fig. 91, p. 52).

Frankfort, the capital, is in the midst of the famous Blue Grass Country, where there is a rich clay soil. **Louisville**, the largest city, is at the Falls of the Ohio, where there is excellent water-power, and it has become a manufacturing center. **Covington** is an important industrial center opposite Cincinnati.

Ohio. 1. What natural regions extend into this state? The eastern portion is much rougher than the central and western parts. 2. What part of Ohio has glacial soils? *See map on pages 2 and 3.*

3. What are the chief crops? 4. What sources of fuel are found in the state? 5. What navigable waters border the state? 6. Judging from the products, name the leading occupations. 7. Describe the location of the capital.

Cleveland (Fig. 79). **Toledo** is on the highway of travel and shipment east and west. It is fortunate in having an excellent harbor with about 20 miles of docks. **Dayton** is a manufacturing center and is in the midst of a prosperous farming district. **Cincinnati** has over 10 miles of water front and very good railroad connections. **Columbus** is the capital of Ohio.

Indiana. 1. Describe the surface features of this state. 2. What navigable waters are available? 3. What are the chief farm products? 4. What sources of fuel are there in the state?

Indianapolis, the capital, is an important railroad center and is surrounded by most productive farming lands. An abundance of raw material and coal is available, and therefore manufacturing has been undertaken. **Evansville** is an important railroad and industrial center on the Ohio River.

South Bend (*see p. 43*). **Fort Wayne** is an important trading and manufacturing city. **Terre Haute** is in the midst of a prosperous farming district and is a busy trading center. **Gary** is the steel-manufacturing center of northern Indiana.

Illinois is entirely within the Central Plains and has a rolling surface. It is a land of rich soils underlain with mineral resources of very great value. 1. What are the chief agricultural products? 2. What other products come from the farms?

3. What are the sources of fuel and power? 4. What navigable waters border or are within the state of Illinois? 5. What large cities are located on navigable waters? 6. Why is the central location of **Springfield** favorable for a capital city? **Chicago** is so situated that raw materials come by water and by rail to supply the great factories of this city. What industries have the farm products developed in Chicago? *See Figs. 88, 89, and 90.*

Peoria is beautifully located on a high bluff bordering the Illinois River near large grain-producing areas. **East St. Louis** is an important railroad center and has also the advantage of transportation by water. Trading and manufacturing are actively carried on. **Rockford** is in an excellent farming district and is also a manufacturing center.

Michigan. 1. What natural region extends throughout the southern peninsula of Michigan? 2. What natural regions extend into the northern peninsula? 3. What bodies of water border these two great peninsulas? 4. Judging from the products, describe the leading occupations of the people in the different parts of this state. 5. What mineral resources are indicated? 6. Name and locate the capital.

Detroit is the largest city in Michigan. *See also page 43 and Fig. 76.*

Grand Rapids (*see p. 43*). **Saginaw** and **Bay City** are manufacturing centers on the Saginaw River. **Flint** is one of the leading cities in the manufacture of automobiles. **Kalamazoo** is in a rich farming land and is favored by excellent railway service.

Wisconsin. 1. What natural regions extend into this state? 2. What is meant by the "driftless area"? 3. What navigable waters are directly available? 4. What mineral resources are shown on the map of Wisconsin? 5. What are the leading farm products? 6. Why should dairying be profitable here?

Madison, the capital, is beautifully situated on the shores of two small lakes. It is the educational center for the state and contains many attractive public buildings. **Milwaukee**, the largest city in the state, has the advantage of being on Lake Michigan and near a very productive farming district. It is a commercial and manufacturing center.

Superior is fortunately located at the head of Lake Superior in the vicinity of iron, lumber, and grain. **Racine** and **Kenosha** are important centers for the manufacture of automobiles and various kinds of farm implements. **Oshkosh** is on the shore of Lake Winnebago near a good farming district and has large sash and door factories.

GENERAL QUESTIONS

1. Name five natural advantages that the people have in this part of the country. 2. Locate the so-called corn belt. Why are swine raised in large numbers in this belt? 3. What state produces a large supply of beet sugar?

4. Where are the tobacco-raising regions in these states? 5. To what places should you go to see the mining of copper, iron, lead, zinc, or coal? 6. What food supplies do the people in this district get from the Great Lakes?

7. The greatest harvester plant in the world is in Chicago. Why is that a good location for this industry? 8. Why has Chicago become a great meat-packing center? 9. What Atlantic coast city is in about the same longitude as Cleveland?

10. What large city in Canada is in about the same latitude as Duluth? 11. Is Omaha or Chicago farther from the equator? 12. Where should you like to go for a summer vacation within these states? 13. Plan out a pleasure trip and describe what you should expect to see.

Home work. Add the boundaries of these states to your map of the United States. Print in the names of the states, the capitals, and a few of the large cities.

CENTRAL STATES
EASTERN SECTION
POLITICAL AND ECONOMIC MAP
Scale of statute miles
0 25 50 100 150 200
Scale of kilometers
0 50 100 200
Military Camps
1 Camp Grant, C 3
2 Camp Custer, E 3
3 Camp Sherman, F 5 [D 3
4 Great Lakes Naval Training Sta.,
5 Selfridge Field, F 3
6 Chanute Field, C 4
7 Scott Field, B 5
8 Wilbur Wright Field, E 5
9 Ft. Sheridan, D 3
10 Ft. Benj. Harrison, D 5
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
MINN.
WIS.
MICH.
ILL.
IND.
OHIO
IA.
MO.
KY.
TENN.
W. VA.
ONT.
Explanation
State capitals
Navigable rivers
Lowlands (Coastal plain)
Central plains
Uplands and plateaus
Old, worn-down mountains
Longitude West from Greenwich
© Ginn and Company

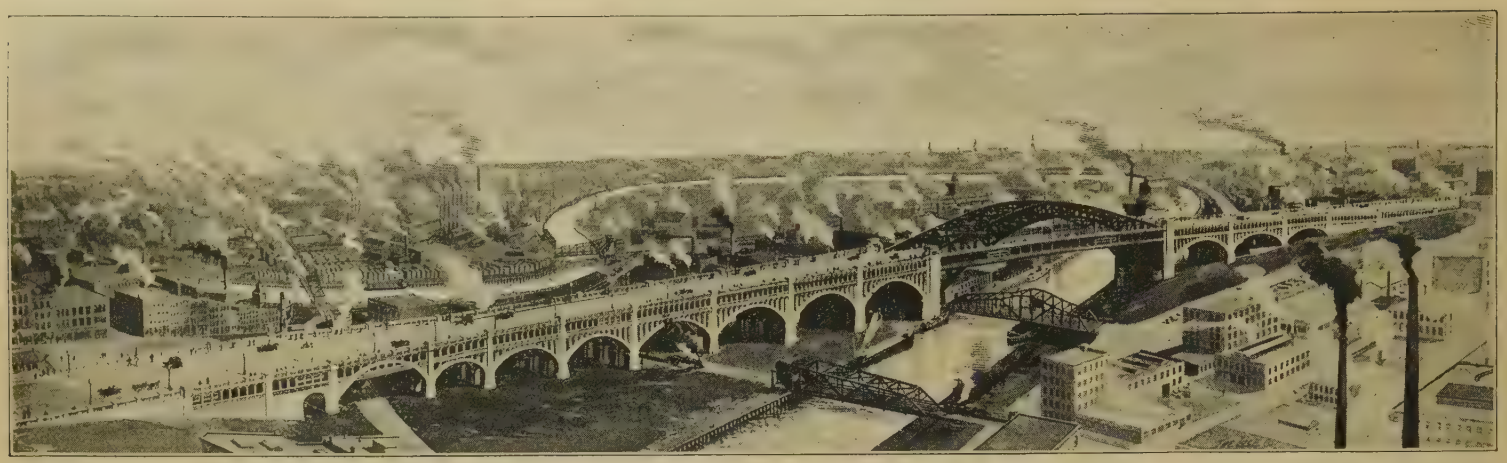


Fig. 79. This is the Superior-Detroit High Level Bridge, which spans the Cuyahoga River at Cleveland. It is made of steel and concrete and is high enough to allow the tallest smokestacks and masts of the Great Lakes vessels to pass under it. Cleveland is one of the most important ports on the Great Lakes and is also a great industrial city. Iron ore from the Lake Superior district is sent down the lakes to Cleveland, and coal comes by rail from the fields of the Appalachian region. What are Cleveland's chief industries? How does Cleveland rank in size among the cities of the United States?

Problems and review questions. 1. What natural regions border the Central Plains? 2. How do the Great Lakes modify the weather conditions near them? 3. Which part of the Central Plains has glacial soils? 4. Where is the Blue Grass Country? 5. In what ways is natural oil, or petroleum, transported? 6. What uses are made of natural gas? 7. Does the mining of the coal in the Central Plains interfere with the use of the surface for farming? 8. If the coal were used at the mines to generate electricity, what saving of work would that mean? What other arguments are there in favor of this plan? What arguments are there against this plan? 9. How did there come to be great deposits of salt in parts of this region?

Settlement and Industrial Development

Early explorations. Plate A in the Appendix shows the early routes of exploration into the interior of the continent. Certain headwaters of the St. Lawrence and Mississippi river systems are so near together that the early explorers carried their boats and outfits from one river system into the other. In Wisconsin there is a short portage from the Fox River (which flows northeastward into Green Bay) to the Wisconsin River. The city of **Portage** is located just where the early explorers crossed from the St. Lawrence system into the Mississippi system. *See map on page 45.* This was the route followed by Marquette and Joliet in 1673, on their trip from the Great Lakes down the Wisconsin and Mississippi to the mouth of the Arkansas. On their return they came up the Illinois and portaged to Lake Michigan.

Fig. 80. This is a view in the business district of Buffalo, showing the broad streets and handsome buildings. The city gets its electricity for light and power from Niagara Falls, twenty miles away. Locate Buffalo on your map and explain its commercial importance. What are its chief industries?

In 1682 La Salle, on his third trip into this region, portaged from the south branch of the Chicago River to the Des Plaines and thence went down the Illinois. *See Appendix, Plate A.* On this trip he followed the Mississippi River to its mouth, taking possession of the country in the name of France and calling it Louisiana in honor of Louis XIV.

The explorers who went westward through the Appalachian Mountains of Pennsylvania soon came to the headwaters of the Ohio River. *See map on pages 2 and 3.* This river was used as a highway of travel during the early days of migration into the Central Plains. Some who came by way of the Mohawk valley to the shores of Lake Erie turned southward into the Ohio and followed it to the southwest.

Many from Pennsylvania and Virginia moved southward between the long Appalachian Mountain ridges and finally found in Cumberland Gap (*see map on pages 2 and 3, K 3*) an easy route to the westward. Some of these immigrants settled in the hilly country of eastern Kentucky and eastern Tennessee, but many of them pushed on beyond the Appalachian Plateau into the Central Plains. In all cases the lakes and rivers guided the early explorers.

Photograph by McKenzie, Duluth

Fig. 81. The harbor of Duluth is protected by a long, narrow tongue of land which nearly connects Duluth and Superior. A ship canal has been cut through this tongue of land, allowing the large lake freighters to enter and leave the harbor. The canal is spanned by a traveling aërial bridge. Foot passengers, teams, automobiles, and trucks are lifted and carried across the canal by this bridge. Great quantities of ore and grain are brought to Duluth and Superior by rail, loaded into the freighters, and sent east by the Great Lakes. Explain the importance of Duluth and Superior as shipping centers

Migrations westward. At the close of the American Revolution a great many people from New England and the Middle Atlantic states went westward and settled in the great agricultural lands of the Central Plains. In those days land travel was chiefly by wagons or oxcarts. As the number of people increased, larger and larger settlements were made, and these grew into prosperous farming communities. Owing to the building of railroads many of the small towns have become cities. Columbus (Ohio), Indianapolis (Indiana), Springfield (Illinois), and Des Moines (Iowa) are examples of cities located in the midst of prosperous farming districts.

Location and growth of cities. The location of cities is greatly influenced by changes in the means of transportation or, as we may call it, by breaks in transportation. When men who are traveling by water find it necessary to abandon their boats and go overland, they must unload their goods, usually stay overnight, and purchase a new outfit. Such delays mean that people begin to congregate where there are breaks in transportation. A little hotel is built, stores are opened to accommodate the travelers, trading begins, and, as the demands increase, more and more goods are brought there to be sold. As the population increases, manufacturing may be undertaken, a railroad may be built to this place, and soon a city has been established.

Lake ports. Many cities in the Central Plains region have developed as lake or river ports where there are advantages in transportation. *See map between pages 95 and 98.* **Buffalo, Erie, Cleveland** (Fig. 79), **Toledo, Detroit, Milwaukee,** and **Chicago** are the larger lake ports of the Central Plains. **Duluth** and **Superior** are large lake ports in an adjoining natural region.

Each one of the lake ports is located at a break in transportation. To-day iron ore is brought by train to Superior and Duluth and then transferred to lake vessels (Fig. 81). Wheat and lumber also come to these ports and are transferred to vessels. Grains and manufactured products from Chicago and farther west are loaded onto vessels leaving that port (Fig. 88). Thousands of automobiles are shipped by water from Detroit. Buffalo receives large quantities of foods and raw materials from the west, and reships much of it by canals or by rail to cities farther east (Fig. 80).

Part of the iron ore brought to Sandusky, Cleveland, Erie, and other Lake Erie ports is used in those cities, but large quantities are transferred to freight cars and sent on to Pittsburgh. On the return westward many of the vessels take coal and manufactured goods for delivery to the upper lake ports. The railroads transfer the products of the farms to the large cities on the shores of the lakes and distribute throughout the country the manufactured goods from the cities. The lake ports are therefore very busy places, where great cargoes of raw materials and manufactured goods are being exchanged.

© C. J. Hibbard

Fig. 82. Minneapolis, located at the Falls of St. Anthony on the Mississippi River, is the greatest flour-milling center in the world. Over 100,000,000 bushels of wheat are made into flour here every year. The city is also a great lumber center. Can you explain the location of these industries?

Fig. 83. St. Louis is located on the right bank of the Mississippi River just south of the points where the Missouri and the Illinois rivers enter the main stream. The city, which has nearly twenty miles of river frontage, is a very important river port and a very busy railroad center. At the right in this picture is one of the great bridges which connect St. Louis with the east bank of the river. In the center are some of the large buildings of the city. Locate St. Louis on your map. What are the advantages of its location? What are its chief industries, and why have they developed?

River ports. **Cincinnati, Louisville, St. Louis, Kansas City, Omaha, St. Paul,** and **Minneapolis** are the larger river ports within this region. **Minneapolis** started as a lumber town. Logs were sent downstream from the forests of Minnesota. Later, when railroads had been built and the great Northwest was open for settlement, large quantities of wheat began to move eastward and flour mills were erected at Minneapolis, until that city has become the leading flour-milling center in the United States (Fig. 82). **St. Paul** has also become an important manufacturing and railroad center and is a large lumber market (Fig. 84).

St. Louis was a trading center in the early days of settlement, and since it was near the junction of the Missouri and the Mississippi, it was a natural outfitting point for travelers (Fig. 83).

The leading cities on the Missouri River are located where transportation westward in the early days was interrupted. The overland routes of migration to the Pacific coast started from **Kansas City.** *See map on pages 2 and 3.* To-day there are magnificent bridges across the river, and travel may go on without interruption. But the cities once established have continued to grow in population and importance. **Omaha** is a river city, but it owes its growth chiefly to railroads. It was made the terminus of the Union Pacific Railroad, which, with its connections, was the first transcontinental railway route. Omaha has become a great railroad center, and with raw materials coming to the city manufacturing has developed (Fig. 85). **Louisville** and **Cincinnati** are the leading Ohio River ports in this natural region.

Courtesy of the Pan American Union

Fig. 84. St. Paul, the capital of Minnesota, is situated across the Mississippi River from Minneapolis, and the two are known as the "Twin Cities." They form a very important railroad center, and four transcontinental railways pass through them. Name the other chief railroad centers in the Central Plains

NOTE. For additional study of cities see pages 44 and 54.

Farming. In the study of agriculture in this region we shall begin at the south and work north and west. In Kentucky, in the Blue Grass Country, there is a rich clay soil, where more tobacco is raised than in any other part of the United States (Fig. 70). This is also a good district for general farming.

The famous corn belt stretches from east to west throughout the Central Plains, with a width of about two hundred miles. In traveling through that portion of the country during the summer we can see thousands of acres of gently rolling country where corn is growing (Fig. 86). The corn belt is in the well-watered portion of the Central Plains and gradually comes to an end in the west as the country becomes drier. At the western end, in Kansas and Nebraska, an occasional dry season means the loss of a corn crop.

Corn is a heavy product to ship, and the farmers have found that instead of marketing corn it is much more profitable to feed it to hogs and cattle and then sell the stock when they are fattened (Fig. 87). This is the reason why corn and swine appear so commonly side by side on the economic maps of the Central Plains region (pp. 45, 55).

Fig. 85. This is a portion of the busy industrial district of Omaha. The buildings in the picture include the car-shops of the Union Pacific Railroad and a great plant for the smelting and refining of gold and silver ores. Because of its location Omaha has become a very important agricultural and industrial center. Seventeen railroads meet here. What do they bring to Omaha? What do they take away? In the early days of westward migration Omaha was one of the points from which the pioneers set forth on their journey westward. What trails did they follow? *See map on pages 2 and 3*

The farmers also raise horses, mules, and sheep. The green cornstalks, if put into silos, make good winter fodder for stock. Some of the fields are always reserved for raising oats, barley, wheat, and vegetables. The zone where most of the oats are raised is a little farther north, running through northern Indiana, Illinois, and Iowa. It begins before the corn belt ends. *See maps on pages 45 and 55.*

Fig. 86. This farmer is standing beside his corn crop to show how tall it has grown. Proper seed selection and soil preparation have produced an abundance of large, well-filled ears. What states are included in the corn belt? What other crops are grown in this belt besides corn?

The great wheat belt begins before the oat belt ends, and wheat becomes a more and more important crop to the northwest and west. Wheat-raising has an important relationship to the climate. It needs from three to four months of weather without frost in which to grow and ripen. Wheat also needs rain in the early part of its growth, but during the ripening period it matures better if the climate is dry and there is plenty of sunshine. To the northwest, in Minnesota and the Dakotas, and to the west, in Nebraska, Kansas, and Oklahoma, we pass into drier and drier regions, where wheat can be raised more profitably than corn or oats.

The broad, level country in the valley of the Red River in the Great Plains of Canada and the United States is a wonderful wheat-producing district, for the soils are very fertile. The valley of the Minnesota River in the Central Plains, just southeast of the Red River valley, is another rich wheat-growing district.

Near each of the large cities in the Central Plains dairy farming, market gardening, and the raising of poultry have been undertaken on a large scale. Many of the dairy products from southeastern Wisconsin and northern Illinois are shipped to all parts of the United States.

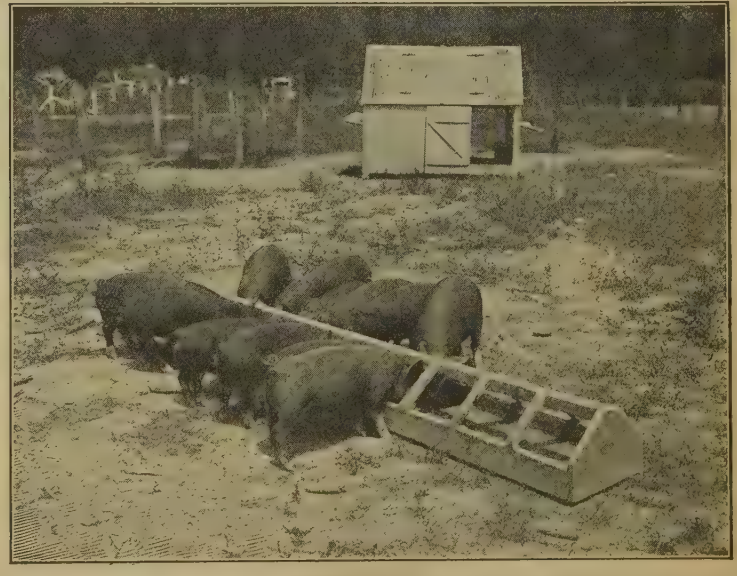


Fig. 87. These little pigs are among the many thousands which are raised in the corn belt. The rich corn is just what they need to make them fat, so nearly every corn farmer also raises hogs. For this reason the corn belt is the greatest hog-exporting region in the world

Wisconsin has more dairy cows than any other state except New York and leads in the production of butter and cheese.

Home work. 1. Find out the meaning and value of rotation of crops. 2. What is meant by winter wheat? by spring wheat?

Influence of farm life upon cities. With the production of such great crops of grain, mills were established in the chief centers of population, where these products might be worked into the form of foods. With the raising of swine, cattle, and sheep the meat-packing business has developed. Chicago became the center for this business and still ranks first (Fig. 89), but now Kansas City, Omaha, Fort Worth, East St. Louis, and other cities have large meat-packing establishments.

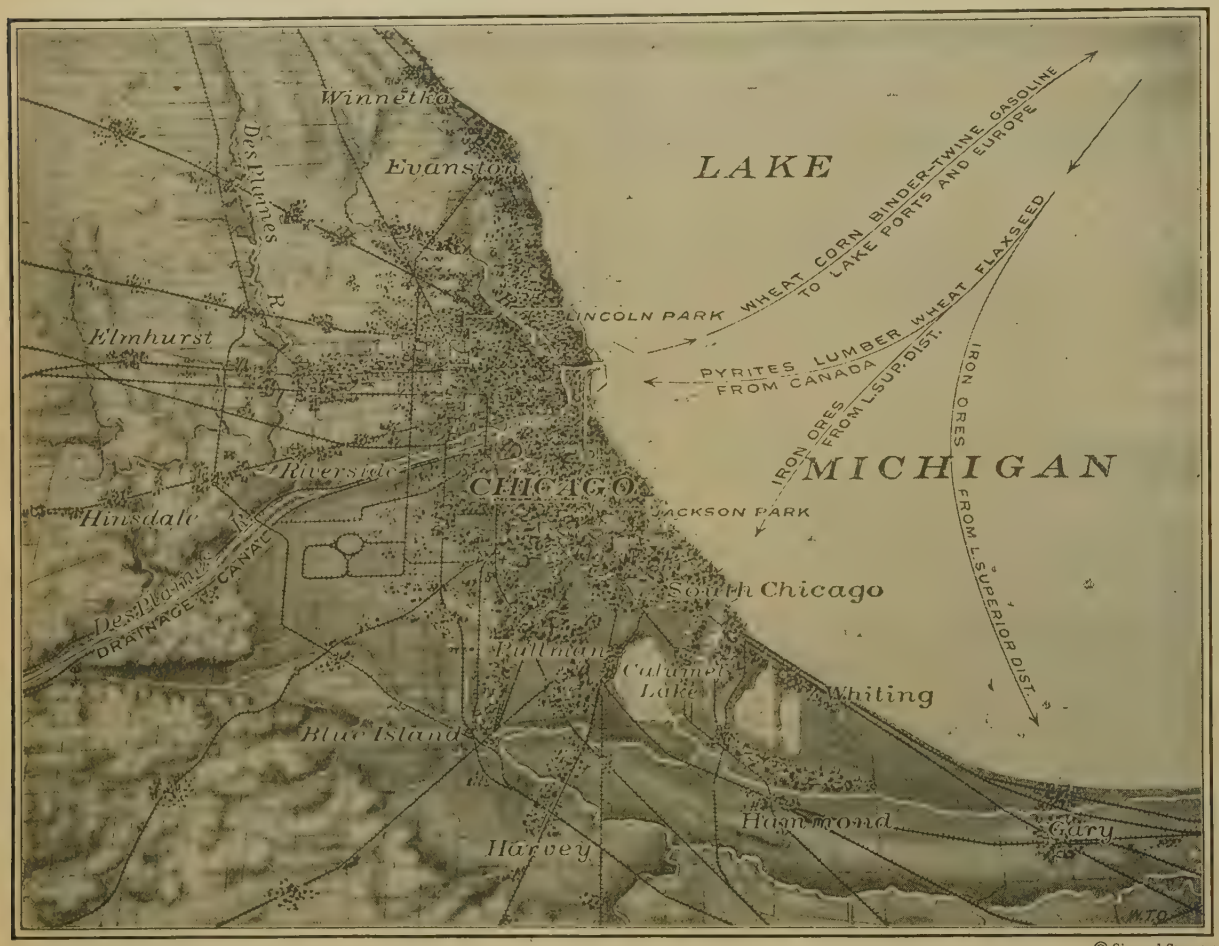


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Fig. 88. This is an aëroplane drawing of Chicago. The low, flat land on which the city is built was once covered by the waters of the lake. The curved margin of the upland southwest of Chicago marks the old shore line. Chicago has no natural harbor, but by widening and deepening the mouth of the Chicago River and protecting it by breakwaters an excellent harbor has been made. The river itself, which used to flow into the lake, has been transformed into a drainage canal by which the waters of Lake Michigan flow into the Illinois River and finally into the Mississippi. How has the location of Chicago favored its development?

More and more food was needed within this region, but the production of food has gone far beyond the local needs, and the Central Plains now supply large quantities of food to other parts of the United States and to many foreign lands.

The farmers needed implements, and at South Bend (Indiana), Chicago and Moline (Illinois), Racine (Wisconsin), Davenport (Iowa), and many other cities great plants have been established for the manufacture of different kinds of farm equipment. Special machinery was needed to make possible the planting of immense fields and the quick harvesting of great crops. This led to the invention of the most helpful farm implements the world has ever known.

The first chilled-steel plow was made by a man who settled on the banks of the little river where South Bend is now located. That one tool has been wonderfully helpful to the entire country. The little blacksmith shop has grown into immense foundries and factories, where some of the best plows in the world are made (Fig. 77). The great reapers and binders, mowing and threshing machines, gang plows, and gasoline motors have been perfected here in the Central Plains.

To give farmers the comforts of running water in their homes, dairy barns, and pastures, windmills were needed. The light metal windmills were perfected to meet this demand. They are wonderful labor-saving devices and encourage us to make much more use of the wind. Some day many farmers may have windmills to generate electricity, which may be held in storage batteries and used as it is needed about the farm buildings.

Every new home had to be furnished. New kitchen outfits were needed. Sewing machines, washing machines, churns, wagons, carriages, pianos, and automobiles were called for. The prosperous farming districts made large demands upon the cities for manufactured articles.

Home work. 1. On an outline map show the routes by which the early explorers and settlers came into the Central Plains. *See map on pages 2 and 3.* 2. Add the boundaries of these states to your map of the United States. Print in names of states, capitals, and a few large cities. 3. Select the five largest cities and work out with the maps what must have been important factors in determining the location of each city.

Mining. The coal mined in this region and the oil and gas produced here supply heat for the homes and power for the ever-increasing number of railroads and factories as well as for the steamships on the lakes and rivers. The oil and gas produced in excess of the local demand are sent to other parts of the country. The demand for the lead, zinc, and salt has kept the mines of Missouri, the upper Mississippi Valley, central New York, and southern Michigan busy producing these valuable minerals.

Manufacturing. With the rapid development of agriculture and mining, the great increase in population, and the construction of railroads, came large demands for manufactured articles. We have mentioned the call from the farmers for such articles. The city populations also needed homes. They needed furniture, clothing, food, books, magazines, and papers, and were ready to buy many luxuries. Industrial life developed in response to this ever-increasing demand. Now many useful articles made in this region are shipped to other parts of the United States and to distant lands.

Problems and review questions. 1. What were the routes of the early explorers into the upper Mississippi Valley? 2. What are the chief navigable waterways in the Central Plains? 3. How have they been improved by man? 4. How may they be made more serviceable to man? 5. Where are there great water-power plants in the Central Plains? 6. What uses have been made of the wood from the forests? 7. What building materials other than wood are available? 8. Why should cities be located at breaks in transportation? 9. Why do farmers in the corn belt usually raise swine? 10. What are some of the modern improvements enjoyed on the farms? 11. How does the development of farming influence life in the cities? 12. How have the industries of the cities influenced life on the farms?

13. Why should the Central Plains of the United States be an industrial as well as an agricultural district? What sources of power are there? What raw materials for manufacture are available? What metals are mined in this region? What very useful metals are found in large quantities in an adjoining region and easily brought to the industrial centers? What means of transportation are available? Where are the customers?

14. What agricultural advantages have these plains? Did most of the soils originate in this region? Is there enough rainfall for agriculture without irrigating the lands? Which portion has the greater rainfall? What means of transportation are available for the modern farmer?

Physical Geography

Land made in the sea. The Central Plains were formerly covered by an interior sea that spread northward from the Gulf of Mexico and covered this part of the United States. In that sea the sandstones and limestones that underlie the region were made.

Uplifting of the land. The land was next uplifted, and the sea was forced to retreat. Rains fell and rivers began their work of cutting up the land and taking the loose material back to the ocean.

Coming of the ice. Next came the Ice Age, when the great continental glaciers invaded the Central Plains. In the eastern portion of the region it was a part of the same great ice-sheet which covered the northeastern portion of the United States and advanced into the Atlantic Ocean. West of the Mississippi the ice came from another center, which was west of Hudson Bay (Fig. 14). Two great ice-sheets, therefore, moved southward from Canadian territory into the upper Mississippi Valley. They crossed the region of the Great Lakes and met south of the driftless area of southwestern Wisconsin and the adjoining states. The southern limit of ice action and the driftless area are shown on the map on pages 2 and 3.

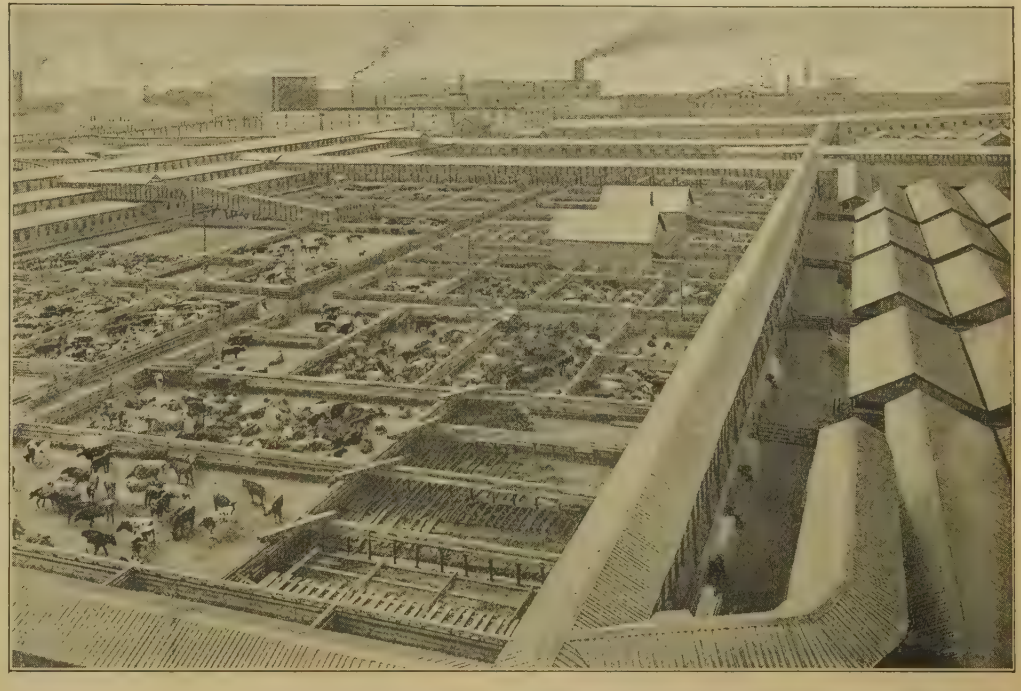

Fig. 89. Chicago is the largest meat market in the world. The stockyards are located near the great meat-packing plants. They contain thousands of pens to which the cattle, sheep, and hogs are taken from the railroad cars and kept until they are purchased by one of the packing companies. From what regions do these different kinds of live stock come to Chicago? To what points is the meat sent?

Retreat of the ice. In time the climate became warmer and the great ice-sheets melted away. They left a mantle of clays, sands, gravels, and bowlders, much as they did in other regions.

Fig. 90. This is a view of part of the lake front at Chicago, a little south of the mouth of the Chicago River. A fine, broad boulevard follows the lake shore, along which there are many hotels and tall office buildings. Chicago is the second largest city in the United States, and although it is a thousand miles from the ocean, it is one of the greatest ports in our country. Using Fig. 88 and the maps on pages 45 and 55, answer the following questions: What products are brought to Chicago by boat? Where do they come from? What is the chief industry at South Chicago and Gary?

The Great Lakes. Before the ice melted entirely away, it stood for a time over the valleys of the Mohawk and St. Lawrence rivers, and during that time the water from the western Great Lakes flowed through other outlets to the south. Lake Superior drained by way of the St. Croix River into the Mississippi; Lake Michigan drained by way of the Illinois River into the Mississippi; and for a time the waters in the basin of Lake Erie drained by way of the Maumee and Wabash rivers into the Ohio. Later the waters from the Lake Erie basin joined those of the Lake Huron basin and flowed westward across Michigan, by a route which is now followed in part by the Grand River, into the basin of Lake Michigan. During this time the water from the Great Lakes found its way to the Gulf of Mexico.

When the ice melted farther back to the northward, the valley of the Mohawk was uncovered and the drainage from the Great Lakes turned eastward, draining for a time through the Mohawk valley into the Hudson. Thus the Mohawk valley once held a mighty river, and the lake waters entered the sea near the point where the great city of New York now stands.

When the ice had melted still farther northward, and the valley of the St. Lawrence was uncovered, the drainage from the Great Lakes chose that northern route because it was the lowest route available. The Great Lakes are drained by the St. Lawrence River to-day.

Fig. 91. In the southern parts of Indiana and Illinois, and in Kentucky, boys have found holes in the ground through which they can descend into great underground rooms. In places they can crawl along tunnels from one room to another. This is because the layers of rock are made of limestone, which the underground waters easily dissolve away, leaving the great caves and tunnels. In some of the caves the roofs and walls are covered with beautiful crystals made by the water. Sometimes, when only a small portion of the roof of the cave is left, it forms a natural bridge like the one at the right in this figure

The former outlets of the Great Lakes are now occupied by small rivers, but the broad valleys which formerly had large rivers when the lake waters drained through them are valuable for farm lands. They are very attractive routes for railroads and canals. From Chicago southwestward in the ancient lake outlet there is an old canal known as the Illinois and Michigan Canal, a new Sanitary Canal, and several railroads. In Ohio and Indiana, canals and railroads follow the former outlets of Lake Erie. The Mohawk valley is the route of the Erie and New York barge canals and of trunk lines of railroads.

Home work. 1. From the tables at the end of the book make a list of the chief lake ports in the order of population. Do the same for the large river cities. 2. How many of the twenty-five largest cities in the United States are in the Central Plains? 3. Which is the second largest city in the United States?

Future. Without any doubt agriculture will continue to be the chief occupation within this Central Plains region, manufacturing will be second, and mining third. With these occupations there has come a great transportation business. Thousands of people will always be needed by the railroad and steamship companies. An increasing population will continue to demand a larger and larger number of traders, storekeepers, and men and women connected with the office work of large business interests. Thus it seems certain that the region will increase in prosperity.

Fig. 92. The drainage basin of the Judith River in Montana is one of the parts of the Great Plains where there is enough moisture to raise grain without irrigation. This view of the basin was taken at harvest time and shows the broad, level surface which is so well suited to the production of grain. The harvesters are being drawn over the fields by a tractor, which makes it possible to cut many acres in a very short time. The chief crop here is wheat. Where is this wheat made into flour? Where is it finally used? What other kinds of grain are raised in the Great Plains region?

GREAT PLAINS

The Great Plains region, east of the Rocky Mountains, is an open, unforested grassland (Fig. 92). Here life has been affected by climate more than by any other geographic factor.

Climate. When the rainfall in any region is below 20 inches a year, the success of agriculture is uncertain unless the lands are irrigated. If the rain averages between 10 and 20 inches, grasses will flourish but the region will not be forested. The prevailing winds are from the southwest, and they give up most of their moisture on the seaward slopes of the high mountains before reaching this section of the country. *See map on page 82.* Rain-bearing winds from the Gulf of Mexico bring some rainfall to the Texas end of the Great Plains, especially in summer.

During the warm season the temperature on the plains near the Canadian border commonly ranges from 70 to 90 degrees, and in the cold season the thermometers register 10, 20, and even 40 degrees below zero. At the Texas end of the Great Plains the winter temperature averages about 45 degrees and the summer temperature averages about 85 degrees. Thus the Great Plains have what is called a continental climate. There are great extremes in temperature and moderate or light rainfall.

Occasionally very warm winds cross the plains, drying up the grasses and crops in summer, and even causing floods in the spring by melting the snow fields. In winter there are fierce storm winds, which bring snow and sleet and are called blizzards. Tornadoes sometimes cross the plains during the summer. Such a storm travels with a great funnel-shaped cloud accompanied by terrific winds which blow down houses, barns, fences, and bridges and do a great deal of damage. Occasionally a house is turned around so that it faces in a new direction. A roof may be taken off, and the furniture may be carried away by the wind. In Texas cold winds, called northers, sometimes come very suddenly and cause rapid changes in the temperature. The abundance of sunshine in this region is favorable to agriculture, and with the help of irrigation large crops are produced.

Natural resources. The grasslands, which have made the grazing of stock possible, are the most important of the natural resources. The soils, especially in the broad river bottoms, are exceedingly fertile, and large crops of wheat (Fig. 92), kafir corn (Fig. 93), and alfalfa are raised. In North Dakota large quantities of flax are grown. Irrigation is practiced in many of the valleys.

Fig. 93. This is a field of full-grown kafir corn. You can see by the measure at the right that it is six feet high. Kafir corn is a drought-resisting plant, well suited to the dry conditions of the Great Plains. Can you name other drought-resisting plants?

In Wyoming, Montana, and North Dakota there are extensive beds of lignite, which is a low-grade coal. Bituminous coal is found near the base of the mountains in Montana, Colorado, and in New Mexico. There are also oil fields in Wyoming and Colorado, and it is very likely that more may be discovered in other parts of this natural region.

MAP STUDIES

The change from the Central Plains to the Great Plains is very gradual. The land is higher in the west, the soils are more sandy, and there is less rainfall. The changes in geographic conditions are such as to make the activities of the people in one region quite different from those in the other.

Minnesota. 1. What natural regions extend into this state? *See map on pages 2 and 3.* 2. What part of the state is without any glacial soil? 3. Explain the numerous lakes. 4. What navigable river rises in this state? Find its source.

5. What is the chief mineral resource? *See Fig. 71.* 6. What are the chief farm products? 7. Name and locate the capital. *See page 48 and Fig. 84.* 8. What is the largest city in Minnesota? *See page 48 and Fig. 82.*

Duluth (Fig. 81) is the gateway to and from the Great Lakes and is second only to New York in the volume of tonnage which it handles. It is the principal shipping point of American iron ores, and one of the great grain markets of the world.

Iowa. 1. Is any part of this state outside of the Central Plains? 2. What portion of the state is without glacial soils? 3. What navigable rivers border Iowa? 4. Judging from the products, name the leading occupation.

Des Moines, the capital and largest city, is near the coal fields and has become a manufacturing center. It is one of the leading cities in the insurance business in the United States. **Sioux City** is the largest city in northwestern Iowa; it is an important railway center. **Davenport** is on a high bluff overlooking the Mississippi River; it is a manufacturing and trading center. **Dubuque** is also on the Mississippi River and is an active manufacturing city. **Cedar Rapids** is in the midst of a most productive farming district and is fortunate in having water-power available. Meat-packing and the making of cereal foods are its chief industries. **Waterloo** is noted for the great variety in its manufacturing.

Missouri. 1. What mountains are in this state? What plateau? What plains? 2. What mineral resources are important? 3. What navigable rivers are available? 4. What are the chief farm products? 5. Describe the location of the capital.

St. Louis is the largest city in Missouri and ranks with the leading cities of the nation in commerce and manufacturing (Fig. 83 and page 48). **Kansas City** is located on the western boundary of the state on the Missouri River, but owes its development largely to the railways. It is in the midst of a prosperous farming and stock-raising district. **St. Joseph** is the metropolis of northwestern Missouri and is a very busy trading and meat-packing center.

North Dakota. Most of this state is in the Great Plains natural region. The eastern part is a fertile lake bottom; the central portion is mantled with glacial soils and is an excellent farming land; but the western part, where the rainfall is light, is useful chiefly as a grazing country.

1. What are the chief occupations of the people? 2. What river that rises near the headwaters of the Minnesota flows northward into Canada? 3. What are the chief farm products of North Dakota? 4. What fuel is found in this state? 5. Where is the population densest? Why? 6. Is irrigation practiced in this state?

Bismarck, the capital, is on the Missouri River in a district where agriculture and dairying are taking the place of grazing. **Fargo** sprang into existence with the coming of the railroad and owes its development to the fertility of the valley of the Red River. **Grand Forks** was first a fur-trading post, but the railroads have made it an important distributing point, and the fertile soils of the Red River Valley have attracted farmers into that part of the state.

South Dakota. 1. What natural regions extend into this state? 2. The Black Hills are a range of the Rocky Mountains. What is the highest peak in this range? 3. What metals are found in the state? 4. What must be the occupations in the different parts of South Dakota?

Pierre, the capital, is one of the largest stock-shipping points in the state. **Sioux Falls** has the advantages of water-power from the Big Sioux River and excellent railroad connections. This city has shared in the prosperity and growth of the great northwest agricultural and grazing regions. **Aberdeen** is another city that owes much to the western railroads and to the development of farming.

Nebraska. 1. What natural regions extend into this state? 2. What large river forms the eastern boundary? 3. What are the chief products of Nebraska? 4. Judging from the products, name the two chief occupations.

Lincoln, the capital, has been benefited by the many railroads that enter the city. It is a manufacturing center and the seat of the leading educational institution of the state. **Omaha,** the metropolis of the state, is a leading manufacturing and meat-producing center and an important stock market (Fig. 85).

Kansas. 1. What natural regions extend into Kansas? 2. What part of the state is most densely settled? Why? 3. What sources of fuel are available? 4. What are the chief farm products? 5. Judging from the products of this state, name the chief occupations. 6. Name and locate the capital.

Kansas City, Kansas, is opposite the city of the same name in Missouri. It is the largest city in Kansas and is an important meat-packing and trading center. **Wichita** has prospered as the farming and stock-raising of Kansas have developed, and it is near some of the great oil and gas fields of Kansas.

GENERAL QUESTIONS

1. Where does the 20-inch rainfall line cross these states? *See map on page 82.* 2. From what district do the great flour mills at Minneapolis get their wheat? 3. What are the chief markets for the cattle raised in these states?

4. What is the notable change in occupation between the dry and wet parts? 5. Does the corn belt extend into these states? 6. As you go to the northwest from the corn belt, what do you find the farmers raising?

7. What interesting sights should you expect to see if you went in a house-boat from St. Paul to St. Louis? Describe such a journey taken in summer. 8. Compare the latitude of Denver with that of Springfield, Illinois. 9. What large Gulf port is in about the same longitude as Kansas City, Kansas? 10. Which is farther from the north pole, Duluth or Spokane?

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Fig. 94. Millions of cattle graze over the Great Plains of Texas. This is a herd of fine-blooded Herefords, an English breed of cattle which the ranchmen raise in great numbers because they can fatten them quickly. To what great centers are these cattle sent when ready for market? Why is Texas a particularly favorable locality for cattle-raising? Can you describe a Texas cowboy's life?

Early exploration. The early routes of migration westward from the Missouri River are shown on the map (pp. 2, 3). Most of the outfitting was done where Kansas City is located. Many exploring parties started westward by way of the Santa Fe trail, crossing the plains to the southwest and going through New Mexico to avoid climbing the Rocky Mountains. The Oregon trail led through the valley of the North Platte, and the California trail branched off from the Oregon trail at points in what is now the state of Idaho, and crossed the Great Basin region. The Lewis and Clark expedition of 1804–1806 followed the Missouri River far to the northwest.

Ranch life. A few of the fur traders, trappers, and miners who followed the trails westward decided to settle in the Great Plains. They chose the valley bottoms for their homes and began raising horses and cattle. The land belonged to the government, and there were no fences. Those were the days when each man's cattle mingled with those of his neighbors, and every season it was necessary, with the help of cowboys, to round up the stock and brand all the calves. This was done before the calves left their mothers; and as the mothers had all been branded when they were young, the ownership of the calves was known.

Later many undertook the raising of sheep. Sheep are able to graze on lands where cattle would starve, and cattle will not graze after sheep have been on the range; hence the necessity of separate ranges. The sheep are always put on the poorer ranges.

For years and years all of the land was freely used by all the people. The ranchmen all helped each other and were most hospitable. They usually traveled on horseback and stopped wherever night overtook them. If they happened to be at another man's home, they went in and made themselves comfortable, whether the owner was at home or not. No one was ever turned away, and visiting became very common among the people. That extreme hospitality has continued to the present day. The people welcome strangers and are most cordial to everyone.

Passing of the open range. More and more settlers came to the Great Plains; the raising of cattle and sheep grew to be very profitable; the call of the great industrial centers farther east for meat, wool, and leather steadily increased. Railroads were constructed. Still more settlers came, the land had to be divided among the different ranchmen, and fences were built. The days of the open range have now nearly passed, but grazing remains the most important industry of the Great Plains (Figs. 94, 95).

A modern ranch. The headquarters of a modern ranch must be near a supply of water. There the home and numerous barns, sheds, and corrals will be built. Near the home there will be fields suitable for raising hay, alfalfa, and possibly some grain.

The ranch must be supplied with modern harvesting machinery and a large number of strong work horses or a few motors. The saddle horses are used chiefly by the men or boys who ride out to oversee the cattle or to drive them to pasture or to some place for shipment. The prosperous ranchmen of to-day all use automobiles for going to town or for transporting supplies.

During the summer while the sheep and cattle are in large fenced pastures, feeding on native grasses, the ranchman and his many helpers are engaged in the fields at home. When fall comes the cattle and sheep are driven into the fields near the home, where for several weeks they may graze and later, when the grass is gone or the ground is covered with snow, they may be fed conveniently.

Fig. 95. The men on horseback in this picture are cowboys who ride over the plains looking after the great herds of cattle. Back of them is a rope corral in which they keep their horses. This picture was taken near Sheridan, Wyoming. Locate Sheridan on the map on page 73. Describe the country and the climate there

Farming. The large rivers that rise in the mountains where there is a heavy rainfall with much snow furnish water for irrigation, and thus farming of a more general nature has been undertaken near the main streams. Large quantities of hay and grain are raised to feed to the stock. Alfalfa fields, when well irrigated, will yield from two to four crops a year. Alfalfa is a member of the clover family, and it helps to enrich the soil by taking nitrogen from the air. The practice of dry farming is now adding to the production of grains in this region.

Courtesy of International Harvester Co.

Fig. 96. The farms of the Great Plains are so large that much of the work must be done by machinery. This is a threshing outfit, which separates the kernels of grain from the stalks. The engine which provides the power is at the left, while the threshing machine itself is at the right

Along the eastern margin of the Great Plains much wheat and corn are raised. Where there is corn there are usually hogs, as in the Central Plains. *See map on page 55.* Near the western margin, especially in Colorado, large crops of potatoes and sugar beets are raised.

Cities. At the western margin of the Great Plains, near the base of the Rocky Mountains, there are several large cities. In the north is **Great Falls** (Montana), where there is excellent water-power, which is used to generate electricity. The electricity is used locally for light and power, and some is sent to **Butte** and **Anaconda** for use in the mines and in the smelters. Many of the railroad trains that cross the Rocky Mountains of Montana are run by electricity generated at Great Falls.

Billings (Montana) is a noted sheep center and one of the principal wool markets of the country. **Sheridan** (Wyoming) is in the midst of an active and prosperous ranching district and has developed a large business in coal and oil. **Cheyenne** is located at the base of the mountains in Wyoming, at a break in transportation, where, in the early days of settlement, many weary travelers stopped to rest and change their outfits before starting on over the mountains. **Denver** is located just east of the mountains (Fig. 99). Smelters, where the ores from the mountains could be treated, were early established at this city. Railroads have greatly helped the growth and prosperity of Denver as well as all other cities in the Great Plains.

© Keystone View Co.

Fig. 97. Another farm machine is the hay-loader, which rakes up the hay and loads it on the wagon. This saves all the labor of pitching it by hand. The machine in this view is at work in an alfalfa field in the Great Plains. How many other agricultural machines can you name? Where are they manufactured? Where are the largest numbers of them used?

From **Colorado Springs** the view of the mountains is magnificent. This city is on the plain east of the foothills and has become a popular resort. **Pueblo** is located at one of the gateways into the Rocky Mountains. Here great smelters have been built to take care of the ores produced in the mountain region. **Trinidad** is situated in the midst of a busy coal-mining section.

Throughout the middle portion of the Great Plains the chief towns are on the lines of the railroads or in the fertile valleys.

Explanation of the Great Plains. The underlying rocks of this region were made chiefly in an inland sea that once reached from the Gulf of Mexico to the Arctic Ocean. Sea bottoms are usually nearly level; and when the land rose and the sea retreated, a plain came into existence. In portions of western Texas one may travel for miles and miles without seeing a single stream or a single valley. The land looks like a vast sea bottom from which the waters have been withdrawn. Streams crossing from the western mountains eastward have brought vast quantities of fine material which they have spread over the surface of the plains. In northern Montana and in parts of the Dakotas there are glacial soils. Instead of being coarse, like the soils which the ice-sheet left in New England, these glacial soils are fine, and especially well suited for raising grain. *See map on pages 2 and 3.*

Fig. 98. The Bad Lands of the Great Plains are cut up into all kinds of strange shapes and forms. This particular area is appropriately called Toadstool Park. Locate the Bad Lands on the map on page 55. Can you explain the cause of these curious surface features?

Bad Lands. In portions of the Great Plains, especially in South Dakota, Wyoming, and Nebraska, are areas that are called the Bad Lands. Here the rainfall is light, and the soil and subsoil consist of soft clays and shales. When rains do come they are usually in the form of severe storms, and the water falls in great abundance for a short period, as from a cloud-burst. The water cuts the soft material into fantastic forms (Fig. 98) and carries the soil away. The rough land is very bad to travel over and therefore received its descriptive name. The Bad Lands are wonderfully interesting places to visit, however, and in the masses of clay are found the bones of some of the largest animals that have ever lived in the history of the world.

Black Hills. The Black Hills of South Dakota and Wyoming (*see map, pp. 2, 3*) are an outlying range of the Rocky Mountains. They were formed by the folding and uplifting of the rocks. The rains and streams have taken away the top of the great fold and uncovered the core rocks, where gold, iron, tin, lead, and zinc have been discovered (Fig. 100). Since the Black Hills rise above the level of the Great Plains, they receive more rainfall than the plains, and their slopes are forested. The dark evergreen trees of the forest suggested the name for the hills, which from a short distance look almost black.

Future. The irrigation works in the Great Plains are sure to be extended and improved. Much more of the land can be used for dry farming. In addition more and more drought-resisting crops will be introduced, and in these ways agriculture will increase in the region. The coal deposits in Nebraska, Kansas, Oklahoma, and Texas will certainly be mined more extensively in the future. The chief occupation of this region, however, will continue to be the raising of cattle and sheep. There is every condition here to favor the future development of this great industry on an even larger scale than at present.

Problems and review questions. 1. How is agricultural life usually affected if the rainfall drops below 20 inches a year? 2. Why do the Great Plains have light rainfall? 3. What storm winds are somewhat common in this region? 4. Where are most of the farms and homes located?

5. Which routes through this region did the early pioneers to the Far West follow? 6. What do you understand by a general round-up? 7. Explain the growth of the larger cities at the western margin of the Great Plains.

8. What are the chief crops of these Plains? 9. Where is there a large area in the Great Plains with no valleys? 10. Why are the Bad Lands so rough?

Home work. 1. Place on an outline map the large rivers that cross the Great Plains. 2. Make a list of the ten largest cities of the Great Plains and a similar list of the ten largest cities of the Central Plains. Use Appendix tables. Compare the total populations in these two groups. 3. Make a list of the foods produced in the Great Plains and compare them with those which are raised in the Central Plains. 4. Read about Buffalo Bill's life in the West.

Fig. 99. Denver, the capital of Colorado, is located on the western edge of the Great Plains, about fifteen miles from the front range of the Rocky Mountains. In this picture you can see the snow-covered Rockies in the distance. Study your maps and explain why Denver has become such an important city

Fig. 100. Lead, South Dakota, is an important mining center in the Black Hills. The rugged mountains of this region are rich in gold, silver, lead, copper, and iron ores, and Lead contains one of the largest gold mines of the world. Explain the relation between the Black Hills and the Great Plains

Fig. 101. These men are preparing for a trip into the Rocky Mountains. After they have strapped their baggage securely on the backs of the mules, they will mount their horses and start off on the mountain trail, leading the mules. What resources make it worth while for men to explore the mountains?

Fig. 102. This procession of mules is off for the mines in the mountains, each animal carrying two heavy planks bound to a packsaddle. The lumber will be used in the mining operations. The mule, although small, is strong and sure-footed and makes a very useful pack animal in the mountains

ROCKY MOUNTAINS

Early explorations. Some of the men who went westward to California along the trails of migration shown on the map (pp. 2, 3) returned to the Rocky Mountains and here discovered gold in the stream gravels. They usually camped by a mountain stream, and one in the party would take some of the gravel from the stream bed, wash it, and test it for gold. In that way many of the first mining camps of the West were located. Some men picked up beautiful specimens of copper ore; others found pieces of lead and zinc ores among the loose rocks in the canyons.

In the early days of settlement the mountain forests had an abundance of large game, and trout were plentiful in the streams. To one who loved the out of doors the life among the mountains was delightful, and it continues to be so to-day. There is still some game, and the streams are kept stocked with fish.

Prospecting for ores. Men would spend weeks or even months hunting for a gold deposit, and many of them made wonderful discoveries. There are thousands of old log cabins in the mountains that were formerly the homes of prospectors. Whenever a rich discovery was announced, hundreds of people would rush in. The first mining was always placer mining, but later tunnels were driven into the hills, shafts were sunk, and simple mining machinery was installed (Fig. 103).

In those early days, when there were no railroads or wagon roads, all of the mining equipment was brought into the mountains on the backs of horses, mules, or even little burros. Mines were sometimes established high up on a mountain, where it seemed as if no animal could go. To-day there are many mines to which all the supplies are brought on the backs of animals that come up narrow trails (Fig. 102), and in some places the ores are sent down the mountains on pack animals.

Coal, oil, gas, and marble. Near the mountains, especially in Wyoming, where there is an open, basin-like area between the ranges, coal, oil, and gas have been found. In Wyoming most of the coal is sub-bituminous; that is, coal of a grade not quite as good as bituminous. Central Colorado is one of the very few places in the United States, outside of eastern Pennsylvania, where anthracite coal is mined. The Colorado mountains also furnish large quantities of excellent marble.

Home work. 1. Get together your pictures of the Rocky Mountains and of life in this region and bring them to school. 2. On your outline map of the United States color the national parks in the Rocky Mountains. 3. Find out the value of an ounce of gold, an ounce of silver, a pound of lead, a pound of zinc. 4. Find out which of these metals is the heaviest.

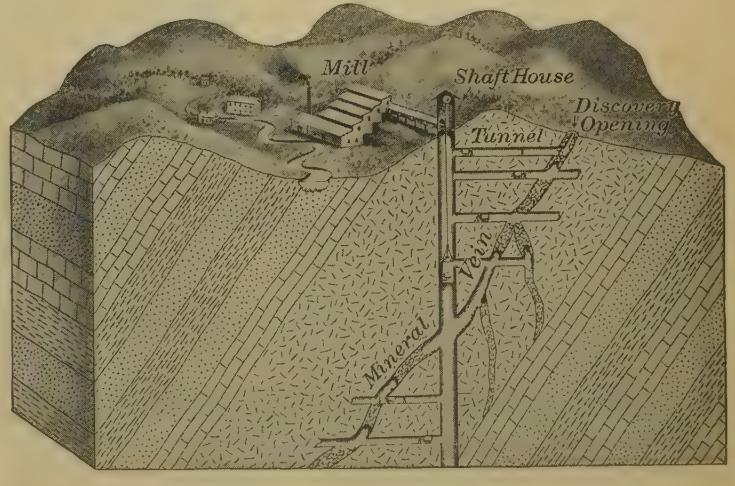

Fig. 103. Ore deposits are discovered where the mineral veins reach the surface of the earth. The prospectors first examine the vein carefully to find out in what direction it runs in the ground; they then "stake out a claim," or mark the land they want to hold for mining; samples of the vein are taken and analyzed; if the value is sufficient, lumber and machinery are brought in, a mill is constructed, homes are built, and the men begin to sink a vertical shaft, like a well, and drive tunnels to one side or the other until they strike the vein. The miners can then blast out the ore, load it upon little cars which are pushed along the tunnels to the shaft, and hoist it to the surface, where it is put through the mill

Ranch life. Some of the Western explorers were attracted by the rich soils in the valleys and in the open parks between the mountain ranges. There, in the midst of most beautiful scenery, they chose to build their homes. In those early days most of the settlers became ranchmen. Their cattle and sheep could graze almost anywhere. The ranchmen would drive them into the mountains during the summer, and in the winter feed them in pastures near their homes. During the summer a ranchman would ride out occasionally to see that his stock was getting along well and had plenty of salt, but he would spend most of his time in the fields near home, raising hay and alfalfa, so that he might be prepared to feed the stock during the winter.

Fig. 104. These men are branding a calf. It looks very cruel, but it really does not hurt the animal much. While one man holds him, the other takes a hot iron and singes off the hair in the form of the owner's mark, or brand. Why is branding necessary in the West?

The Rocky Mountain region is not yet densely settled, but the more desirable farm lands have been taken up. Large areas of the mountain region are included in the national parks or national forests. There is some open range, where anyone who chooses may pasture stock, but most ranchmen now have a particular valley for their cattle and a definite area where their sheep may graze during the summer. Those who do not own grazing lands may pasture their stock on an open range or get permits to turn them into a national forest.

The assignment of grazing lands in the national forests is made by officers of the government, and each ranchman pays a small fee for every animal pastured. It costs the ranchman each year about 37 cents per head for cattle and about 7 cents per head for sheep.

Fig. 105. These sheep are grazing on one of the open pastures high up in the San Juan Mountains. What season of the year is it? Can you explain the absence of trees here?

The sheep must be carefully guarded, so that bears, wolves, coyotes, or mountain lions may not get them. They must be kept in the pastures assigned to them, and therefore a shepherd is left with each flock. Most of the sheep pastures are in huge open basins high in the mountains, above the timber line (Fig. 105). Here a shepherd and his dogs will live all summer long with about two thousand sheep. Every few days the camp tender will bring him a supply of food and perhaps help him to move his camp to a fresh grazing field.

By September, when the nights in the high mountains become very cold and when heavy snows are quite likely to fall, the shepherds begin to drive their flocks into the foothills and later out to the pastures where they are to be fed and protected through the winter. In the spring the shearing is done. The warm coats of the sheep are clipped, and the wool is shipped to market. Immediately after the shearing comes the dipping (Fig. 106), and after that the sheep, with their lambs, return to the mountains. The sheep must be branded each year, for the brand is of paint. Even the lambs are usually branded.

Orchards. Many of the mountain valleys have proved to be good places for raising fruit (Fig. 108). Large quantities of apples, pears, peaches, and plums are raised. Most of the fruit must be shipped to city markets. Some of it is canned.

Location and growth of cities. Within the mountain area the location of certain of the larger cities has been determined by the discovery of rich ores. Beginning in the north, we find that the chief mining centers include **Cœur d'Alene** in Idaho, **Butte, Helena,** and **Virginia City** in Montana, and **Leadville, Cripple Creek, Ouray, Telluride,** and **Silverton** in Colorado.

Most of the smaller cities in the mountains owe their location and growth chiefly to the local development of ranches or of orchards, but in every case the construction of railroads has greatly benefited the cities.

NOTE. For a special study of the cities in the northern and southern sections of the Rocky Mountains see pages 72 and 77.

Native vegetation. The lower slopes of the mountains and the lands between the ranges, called either valleys or parks, are grasslands. Next higher come the forests, and above the timber line there is more grass. The highest peaks, the very steep places, and the areas of loose rock are without coverings of vegetation. The trees of the forests are chiefly pines, spruces, and hemlocks. Among these great evergreen trees there are some birch trees and little groves of quaking aspen.

National forests. Many of the forests in the Rocky Mountain region are now under control of the government. They belong to all the people and are cared for by men trained in forestry. Each forest is divided, and a forest ranger is assigned to each section. He rides over the trails, watching for possible forest fires, and sees that the ranchmen keep their herds and flocks in the proper pastures. It is his business to count the cattle and sheep that enter the national forest each spring and to mark the trees which may be cut for lumber. Each ranchman or settler is allowed by law a certain amount of wood every year from the national forests. This is to help him with his buildings and fences. If the ranchman wants more wood than his allowance, he may buy it from a national forest. Those who wish to go into the lumber business near the national forests may purchase from the government such trees as the forester marks for this purpose. Burned-over districts are replanted by the Forest Service.

Fig. 106. At the dipping season the sheep are pushed into a trough and forced to swim through a solution which kills the ticks, little creatures that live on the skin of the animal and spread deadly disease

The range riders often have their homes in the beautiful canyons among the mountains. Each man keeps several excellent saddle horses. In the morning a fresh horse is caught and saddled, and the ranger starts off for a day's ride over some of the wonderful forest trails (Fig. 192). In many places the trails are along the very tops of the mountains. In southern Colorado there is a trail known as the Continental Divide trail, which follows the great watershed for nearly a hundred miles (Fig. 109). As the ranger rides over it the forests appear on either side below him. He can see for miles and miles and can easily detect the beginning of a forest fire. In some places outlook towers have been built for the rangers. There are telephones connecting the ranger stations, so that the men can quickly communicate the news of a fire or of stray sheep or cattle.

When a forest ranger must be gone overnight or possibly for two or three days, he usually puts a camp bed, a supply of provisions, possibly his fishing rod, and a few cooking utensils on the back of a small mule and

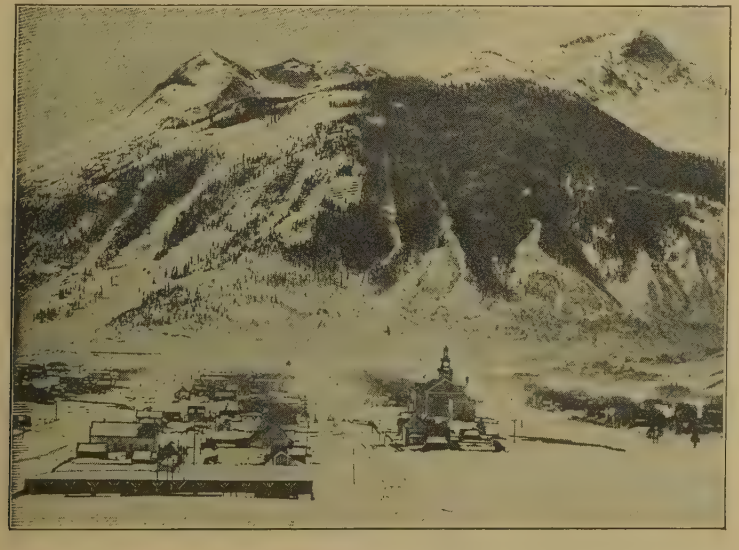

Fig. 107. This is Silverton, Colorado, on a winter evening. Silverton is a typical Rocky Mountain mining town, which has grown up because of the rich deposits of gold, silver, lead, and zinc ores which have been found in the surrounding mountains. Locate Silverton on your map

© P. H. Troutman, Canon City, Colo.

Fig. 108. On cold nights the Colorado fruit-growers burn oil in their orchards. The cloud of smoke which rises from the flaming oil pots hangs over the orchard like a blanket and prevents the heat of the earth from escaping. In this way the fruit trees are protected from frost

Fig. 109. The trail over the Continental Divide in Colorado zigzags up over the slopes and is so narrow that the horses must go in single file. Trace the line of the Continental Divide on your map. At what points did the early pioneers cross it? *See map on pages 2 and 3*

Courtesy of Wiswall Bros. and Denver Tourist Bureau

Fig. 110. This is a distant view of the Rocky Mountain National Park. It is in the heart of the Rockies in north central Colorado, and its peaks rise to more than thirteen thousand feet. Locate this park on your map. How many of our national parks are in the Rocky Mountains?

starts off on a saddle horse, leading the pack animal. With such an outfit he can travel and live independently, for his hotel travels with him. His route may take him through a beautiful canyon or high over the mountains. He may follow a trail in the forest or be far above the timber line, where the sheep are grazing. For his camp he will select a place where there is good grass for his saddle horse and pack mule and a supply of water and firewood. The pack and the saddles are taken off, and the animals are turned out to graze overnight. He may catch a few mountain trout and then build a fire and cook his evening meal. A few fir boughs, properly laid down, make a good bed for him. Next morning after breakfast he must pack up and start over new trails, through deep canyons, or over high crest-lines, by beautiful lakes and wonderful waterfalls. Such is the ranger's life in summer. During the winter he supervises the cutting of timber.

Home work. Make out as long a list as you can of the different varieties of trees that grow in the forests of the United States.

Fig. 111. In winter, when the snow is deep in the Rocky Mountains, it is hard to keep the railroad tracks clear so that the trains may go through. This view shows five engines pushing a railroad snowplow up grade. Why is the snowfall so heavy in this region?

Water-power. When the rain falls in these high mountains, it collects in little rivulets, which unite to make mountain streams. These often descend through the canyons as rushing torrents. The snows which fall nearly every month in the year contribute water to the streams, especially during the summer season. Where the streams come to cliffs or precipices in their courses, there are waterfalls. Near the mining camps, where power is needed for running the drills, hoisting the ores, running the mills, and lighting the mines, the water-power is often utilized to generate electricity. The power plant is usually located near a waterfall, and the electricity is transmitted by wire over the tops of mountains, if necessary, to where the mines are located. Most mining towns are lighted by electricity. At Shoshone, Colorado, near Glenwood Springs, is one of the very large power plants. From this point electricity is transmitted over copper conductors, supported on steel towers, for distances of more than 150 miles. Denver and many of the cities and mines in central Colorado receive power from the Shoshone plant.

A few of the railroads in the Rocky Mountains are now run by electricity, and some day all of them may be operated by electric power.

© Gregory & Cheney, Ouray, Colo.

Fig. 112. High up on the slopes of the mountains, where there is much snow and only a little vegetation, live thousands of wild Rocky Mountain sheep

Problems and review questions. 1. What first attracted men to settle in this region? 2. Describe the life of a prospector. 3. What are now the chief resources within this region? 4. Why should stock-raising be profitable among the mountains? 5. Why must the sheep be guarded?

6. Where are their summer feeding grounds? 7. Why should the government charge a board bill for sheep and cattle that graze in the national forests? 8. What are the various duties of a forest ranger? 9. What sources of power are there in this region?

10. Why should the mountain scenery be considered a valuable natural resource to the American people? 11. What occupations may attract more settlers to the Rocky Mountain region? 12. What has determined the location of the larger cities in this region? Give several examples.

13. How much rain falls in these mountains? *See map on page 82.* 14. How do seasonal changes in climate affect the life of the stock-raiser? of the forest ranger?

Photograph by Haynes

Fig. 113. These are a few of the thirty thousand elk which roam through the Yellowstone National Park. Our government is making a great effort to preserve the wild animal life of our forests and plains by enforcing strict laws about hunting. Why is this wise?

Mountain scenery. No one can visit the Rocky Mountains without wondering how they were made, why the rocks in some places stand straight up and in other places are horizontal, why in some places they are sandstones and limestones and in other places granites, marbles, or great thick layers of lava. The entire region is a real wonderland of natural beauty.

© R. E. Marble

Fig. 114. This is one of the ninety glaciers from which Glacier National Park takes its name. They are the small remnants of the great continental ice-sheet which once spread over this area

Fig. 115. Diagram of a mountain fold the top of which has been cut away

The outer portion of the earth, in the region of the Rocky Mountains, was compressed, and the rocks were arched, or upfolded, as in Fig. 115. Rains, winds, frosts, and glaciers all helped to wear away the tops of the folds. Little by little each mountain fold was cut by streams and by glaciers. The rock that was in the center, or was the core of the mountain range, appears now in the peaks, while the upturned rocks in the foothills on either side are what is left of the great layers that made the top of the fold, or arch.

In some places in the Rocky Mountains, when the earth was being folded and uplifted, volcanoes broke out and built up mountains of lava mixed with rock fragments that were thrown into the air. Great sheets of lava poured forth and covered hundreds of square miles of the surrounding country.

National parks. In northern Montana at the east margin of the mountain area is Glacier National Park. This is a region of magnificent mountains, beautiful lakes, many small glaciers, and with forests, shrubs, grasses, and an alpine flora that add to the beauty of almost every view (Figs. 114, 116).

Yellowstone National Park is chiefly in northwestern Wyoming. It is a region where there were many active volcanoes. Below the surface there are hot rocks which heat the waters circulating through the cracks and fissures, and the waters come out of the ground as hot springs and geysers (Fig. 119).

Rocky Mountain National Park is in the central part of northern Colorado. This is a region of high mountains, broad valleys, and fine forests (Fig. 110).

© R. E. Marble

Fig. 116. Glacier National Park also contains many beautiful lakes. They occupy parts of the valley floors which were broadened and deepened by the glaciers. This one is Lake Ellen Wilson

© Gifford (for Northern Pacific R.R.)

Fig. 117. The Great Falls of the Yellowstone River are among the wonders of Yellowstone National Park. The water falls over a sheer precipice three hundred feet to the canyon below. How do these falls compare in height with those of Niagara? Locate Yellowstone National Park on your map

Photograph by Haynes

Fig. 118. The beautiful hot-spring terraces in the Yellowstone National Park have been built up by the white limy deposits from the cooling waters of the springs. These terraces are gorgeously colored with bands of bright red and yellow, while the water in the pools is a deep blue-green

Ice age in the mountains. When the continental ice-sheets formed in Canada and advanced into the northern part of the United States, there were thousands of smaller glaciers in the Rocky Mountains. At that time snows accumulated near the summits to such great depth that ice was formed, and the ice moved down the canyons, deepening each gorge and carrying away the loose material.

Many of these glaciers reached the foothills of the ranges and some advanced for short distances over the bordering lower lands. The deposits of morainal material indicate how far the glaciers extended over the lowlands.

In time the climate changed; there was less snowfall in the mountains; all of the glaciers became smaller because of melting, and most of them disappeared (Fig. 114).

The glaciated canyons have the glacial drift, or moraines, in them; for when the ice melted, it left on the bottom of the canyon all the stones, sands, gravels, and clays that it was carrying. In some places these moraines blocked the drainage, and lakes were formed. Sometimes the ice gouged out the solid rock and made basins where waters have accumulated and formed lakes.

In places the main canyons were deepened so much more than the tributary valleys that the tributary streams now fall from the side valleys into the main canyons, thus making many beautiful waterfalls.

Photograph by Haynes

Fig. 119. "Old Faithful," the most famous Yellowstone geyser, erupts regularly every sixty-five minutes, throwing a stream of hot water one hundred and twenty feet into the air

Future. We have found the chief occupations in this region to be mining, grazing, farming, lumbering, and fruit-raising. More and more people are sure to settle here and go into one or another of these lines of work.

There is a wonderful supply of water-power in the mountains, and relatively little of it is used. It is probable that some day all the people will have electricity for lighting and heating their homes and for running their sewing and washing machines and their saws for cutting firewood. Electricity could be used for cooking and for ironing in the mountain homes. Perhaps this will come about sometime, when the mountain communities plan to coöperate.

The forests will be a constant source of lumber and will afford pleasure to all who live in them or visit them. The harmless varieties of wild game should become more abundant. Airships may be used to patrol the forests. Each year thousands of busy people will seek a change from the active life of our large cities in a vacation spent in this region of magnificent scenery, good fishing, and cool summer climate.

Problems and review questions. 1. Explain briefly the ways in which these high mountains were made. 2. Are there any glaciers in the Rocky Mountains to-day? 3. What signs of ancient glaciers are there in the mountains? 4. Where did these glaciers form? 5. Why did they disappear? 6. By what natural forces are the mountains worn down? 7. What national parks are within this region?

WESTERN PLATEAUS

These plateaus extend from north to south between the Rocky Mountains on the east and the Cascade and Sierra Nevada on the west. The chief subdivisions are the Columbia Plateau, the Great Basin, and the Colorado Plateau. *See map on pages 2 and 3.*

A problem. *Use map opposite page 82.* Suppose we think of a high plateau country in the temperate zone nearly surrounded by mountains. Suppose there are canyons more than a mile deep in the plateau, and mountain ranges rising from 2000 to 5000 feet above its general level. The region has a very dry climate with less than 10 inches of rainfall annually over the greater part, but with from 10 to 20 inches in certain portions. What would primitive peoples do for a living in such a region? Where would they make their settlements? Would civilized people want to live there? What occupations would they find profitable? Where would they build their homes? What would they do for water? This is a large geographic problem, and it is a real problem for the people who are trying to make a living in the great plateau region of our Western states.

Fig. 120. In the Mesa Verde National Park in Colorado are the wonderful ruins of the cliff-dwellers, a prehistoric people who made their homes under the overhanging cliffs of the great wooded mesa. This is the Cliff Palace, the largest of the dwellings. It is 300 feet long and originally contained 200 rooms

Native tribes. Several tribes of Indians now live on these plateaus. They make their settlements near the streams in order to have drinking water and a chance to irrigate some of the land (Figs. 121, 123). In America some of the tribes of Indians practiced irrigation before the white men did. These people raise sheep and horses. The Navajo Indians are good shepherds. They are also expert weavers and make much of the wool from their flocks into blankets.

Some of the Indian tribes live on mesa tops, where their ancestors settled long ago, when they feared the attacks of hostile tribes. In many of the canyon walls there are the ruins of ancient cliff-dwellings (Fig. 120). Those people made their homes where they could easily fight off enemy tribes. The cliff-dwellers irrigated the lands in the canyons, raised vegetables, and hunted wild game.

White settlers. The white people who have settled in this plateau region have been attracted by the rich deposits of minerals in the mountain ranges of the desert or by the fertile soils. The lands about the margin of the desert are most easily irrigated, and many of the cities and towns are on the edge of the desert, where great irrigation projects have been developed. *See maps on pages 73 and 76.* The white people often get their water from the neighboring mountains. Reservoirs are made, and the waters are piped for many miles to the settlements. The mining towns must of course be located near the place where the ores are discovered. This means that they are in or near the desert ranges.

Rainfall. When a land is surrounded or nearly surrounded by mountains it is quite sure to be a semidesert, possibly a desert. The winds that cross our plateau states come chiefly from the southwest. They take up an abundance of moisture as they pass over the Pacific Ocean, but as the air rises to cross the Coast Ranges and then the Cascade Mountains or the Sierra Nevada, the moisture is forced out and falls as rain or snow on the windward sides of the mountain ranges. When the air descends into the plateau region, it becomes warm. Warm air tends to take up more moisture; so the winds, as they pass eastward across the plateaus, tend to

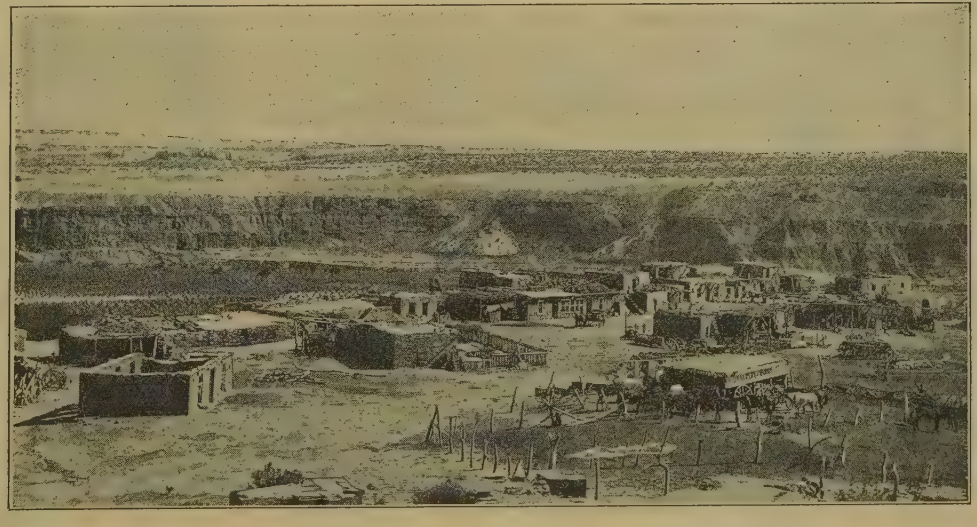

Fig. 121. This is a typical village of the Colorado Plateau. It is located in the dry valley, or "wash," as it is called, of one of the tributaries of the Colorado River. The little stream which flows at times through the wash furnishes water for irrigating the fields. Notice the low, flat-roofed buildings and, in the distance, the barren, level surface of the plateau

dry up the country rather than to give up their moisture. Some of the local mountain ranges within this semidesert region succeed in getting a little rain from the winds. Trees and grasses will grow on these mountains, while the surrounding plateau surface will have little but sagebrush, greasewood, cacti, and yucca (Fig. 122 and map opposite page 82).

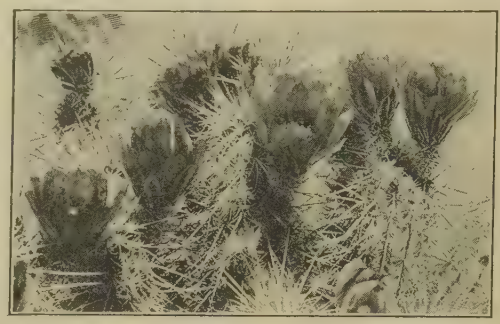

Fig. 122. This is the beautiful cholla cactus, one of the plants which grow on the dry Colorado Plateau. The prickly spines which surround the stem are characteristic of desert vegetation

Changes in temperature. In all arid regions the temperature varies greatly between night and day. When there is little or no moisture in the air, the ground during the day becomes very warm. In summer the stones are so hot that it is uncomfortable to touch them. The air just above the ground also becomes very warm. In the southern part of this region the temperature rises to 120 degrees Fahrenheit during the summer days. When night comes the heat passes off through the air very rapidly; the stones and earth become cold, and the air above the ground loses its heat. The temperature continues to fall until sunrise of the next day, and the hours just before the sun rises are the coldest of all the twenty-four hours.

Fig. 123. This is one of the Indian villages of the arid Southwest. The houses are made of adobe, or bricks of sun-dried clay, and are grouped about an open central square, or plaza. Why are the houses not made of wood? What do the people do for a living?

Irrigation. In many parts of the plateaus the soils are fertile and deep, but there is not enough water for farming. Irrigation from the rivers that rise in the high mountains has long been practiced by individual farmers. Since 1900 the Federal government has begun to provide water for the irrigation of this region through twelve national irrigation projects.

Fig. 124. This is a Hopi Indian house near the Grand Canyon. It is built exactly as the ancestors of the Hopis built their homes centuries ago, and in it live a large number of Hopi families

Great dams have been built across the larger rivers, thus creating artificial lakes, or reservoirs, for the storage of the stream waters at the flood seasons. From the reservoirs the water is carried by canals to the lands that are to be irrigated, and is then distributed to the separate fields by means of small canals or ditches. In this way the water can be turned into the fields at just the time and in just the amount that is needed. By means of these government irrigation projects thousands of acres in the Western Plateaus are being irrigated, and the farmers of this region are thus able to raise successfully large crops of grain, forage, fruits, vegetables, and cotton.

Physical Features

The Columbia Plateau is made of extensive flows of lava. The lava poured out of the earth along great cracks, or fissures, and spread over the country. One flow followed another until the lava was over a mile in depth. It filled up all the low places and buried hills and even mountains. To-day the mountains that remain, of which the Blue Mountains of Oregon are a good example, are nearly buried in lava. Later on, rivers cut their valleys through the lava, and two of them, the Columbia and the Snake, have made wonderful canyons in the plateau. In the canyon walls of the Snake River, far below the present surface of the country, can be seen the outlines of the old hills which were buried by great outflows of lava.

Fig. 125. This Hopi Indian girl is very skillful in the art of basket-making. The weaving of beautiful baskets and rugs, often wonderfully colored, is an important industry among these Indians

Great Basin. South of the Columbia Plateau, and including most of Nevada and parts of Utah, Arizona, and California, there is a region bounded by mountains where there is inland drainage; that is, the streams cannot flow to the sea. The rains that fall on the neighboring mountains flow into the basin, where most of the streams either dry up or sink into the ground. A few streams empty into lakes, some of which have no outlets. The best example of this kind of lake is Great Salt Lake, where the water contains nearly as much salt as it can possibly hold in solution. Each stream that flows into the lake brings in some salt, and as the water is lost from the lake by evaporation the lake has become more and more salty.

During the ice age, when the climate was less dry, this lake was a thousand feet deeper than it is now and spread over much of western Utah. At that time it had an outlet to the Snake River and was a fresh-water lake.

Between the mountain ranges in this basin region there are large quantities of sands and gravels and fine soils, which streams have brought from the mountains and spread out on the lower lands. The soils are excellent and, when water is brought to them, wonderful crops are raised.

Death Valley is in the Great Basin. It is east of the Sierra Nevada in southern California and is the lowest land area in the United States. The bottom of the valley is from 250 to 280 feet below sea level.

Colorado Plateau. Southeast of the Great Basin, and including parts of Utah, Colorado, Arizona, and New Mexico, is the Colorado Plateau (*see map, p. 76*). This is probably better known and more remarkable than any other plateau in the world. Its fame is due chiefly to the Grand Canyon, which is the most magnificent scenic feature on the earth (Fig. 126). For 250 miles the Colorado River has cut a gorge into the plateau; in one place this gorge is nearly 6000 feet deep. If ten columns the size of the Washington Monument were placed one upon the other, rising from the stream level, they would not quite reach the elevation of the rim of the canyon. If all of Mt. Washington above sea level could be placed in this gorge, its summit would rise only a few feet above the rim. From the rim of the gorge the river at the bottom of the canyon appears no larger than a tiny brook.

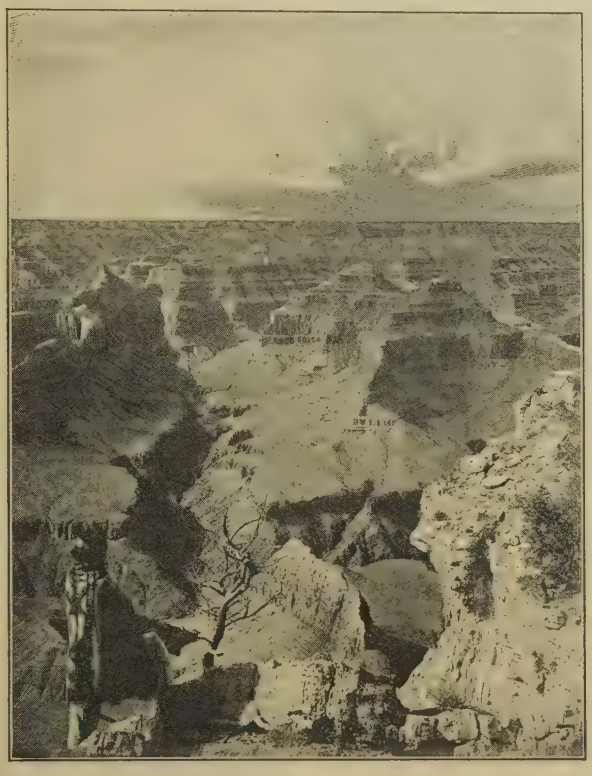

Fig. 126. If you could stand beside the Indian in this picture, you would be looking out over the greatest gorge in the world, — the Grand Canyon, which the Colorado River has carved in the level plateau of Arizona. The opposite rim of the canyon is twelve miles away, and the river itself is over a mile below

In its most magnificent portion the canyon is from 10 to 12 miles wide, and yet in the clear, dry air of the desert the farther wall appears to be much less than a mile away. The canyon is perhaps most remarkable for its coloring and for the great variety in the rock formations. Each layer of rock has some distinctive shade. There are bands of red, green, brown, and gray. One layer, about 500 feet thick, has a brilliant red color; this layer is so situated that it may be seen from any point on the rim. Bordering the canyon on the south there is a forest of yellow pines with beautiful open parks. In the canyon itself the vegetation is chiefly that of a desert, with sagebrush, a few cedars, and cacti.

Sitting on the rim of this great gorge, one sees the colors change from hour to hour with the change in the sun's position or as clouds shade one portion or another. Sometimes clouds form below the rim. Lightning is seen to flash through the clouds, thunder is heard, and rain falls in the canyon. As the storm clears away, the whole scene changes; the vegetation has been freshened and the rocks that have been moistened during the rain have a peculiar brilliancy of color.

Fig. 127. This is one of the four great natural bridges in southeastern Utah, which are the largest in the world. The people standing on top give an idea of its great size. Compare this view with Fig. 60. How do you suppose this bridge could have been made in so dry a region?

Fig. 128. This is Bingham, one of the important mining centers of Utah. Notice the way in which the city has spread up the two valleys which meet in the foreground of the view. In the background is the mountain of copper ore which caused the development of the city

If one descends to the stream, as is possible at a few places by following carefully made trails, the water is seen to be yellow. It is about the color of coffee with cream in it. When a sample of the water is taken and allowed to stand, a thick layer of yellow mud settles to the bottom. This mud tells the story of the making of this wonderful gorge. The canyon was carved and is still being deepened by the stream which flows through it and by the little streams that flow down the canyon walls. This work has taken millions of years.

Home work. 1. Read about the cliff-dwellings in the Mesa Verde National Park. 2. Read about the Navajo, the Acoma, and the Hopi Indians. 3. Read a special description of the Grand Canyon of the Colorado River.

Discovery of natural resources. *See maps on pages 73 and 76.* As white men came to know this part of the western country, they discovered certain portions where, with the help of irrigation, agriculture could be carried on very successfully. They also discovered gold, copper, silver, and iron. Borax has been found within this region, and there are many places where salt is secured.

The waters of Great Salt Lake are pumped into fields surrounded by dikes and then allowed to evaporate. As the water is taken up into the air the salt is left on the ground; later it is plowed up and sent to a refinery, where it is prepared for market.

Growth of mining centers. **Bingham** in Utah (Fig. 128), **Reno, Carson City, Virginia City, Tonopah,** and **Goldfield** in Nevada, and **Jerome, Globe, Clifton,** and **Bisbee** in Arizona are among the many mining centers that have grown up in this region. Gold, silver, copper, lead, zinc, and some other minerals are obtained.

Farming and fruit-raising with irrigation. Wonderful changes have been made through irrigation. Large areas of dusty sagebrush deserts have been transformed into beautiful, green, and productive garden spots. Just west of the Wasatch Mountains in Utah, in the fertile valley of the Jordan River, there is a chain of

Fig. 130. Salt Lake City was founded in 1847 in the desert just west of the Wasatch Mountains. By irrigation from the mountain streams this desert region was made fertile and productive. To-day the city is an important railroad terminus and the business center of the irrigated farming country which surrounds it. Locate Salt Lake City on your map

agricultural settlements where irrigation is practiced. **Ogden, Salt Lake City** (Fig. 130), and **Provo,** three of the largest cities in Utah, are located at the western base of the Wasatch Mountains in the midst of irrigated lands.

In Idaho, bordering the valley of the Snake River, and in Washington, near the Columbia River, there are several large irrigation projects. **Spokane** (Washington) (Fig. 129) has grown up on the very margin of the Columbia Plateau, at the edge of the mountain belt. At **Wenatchee** in the Columbia valley, in the Yakima and Boise valleys, and in many other places there are wonderful orchards (Fig. 132).

The Salt River irrigation project in Arizona has led to the extensive production of the long-fiber Egyptian cotton in the vicinity of **Phoenix.**

Fig. 129. The falls of the Spokane River provide valuable water-power for the city of Spokane and make possible its manufacturing industries. This view shows the lower falls as they rush over the great dam. Above the dam is the power plant which transforms the water-power into electric power. How many other cities can you name which have developed because of water-power?

Dry farming. In certain parts of the Columbia Plateau where the soils are rich, but where there is not sufficient water for irrigating the land, the settlers practice dry farming. The soils are carefully cultivated so as to make the surface material as fine as possible. That will delay the evaporation of moisture.

In places great crops of wheat are raised where formerly nothing but sagebrush grew. The roots of the

Fig. 131. This sturdy pair of horses is hauling a load of baled hay to market in central Washington. This part of the state receives a light rainfall, but irrigation and dry farming have turned it into a good farming country. What are the principal products of this area?

wheat reach far down into the ground and there find some moisture. With some crops the soil is cultivated very frequently.

These methods are adding large areas to the lands that may be used for producing foods.

Future. More of the waters coming from the mountains will be utilized in irrigating the margin of the Western Plateaus (Fig. 133). Then more people can be accommodated there and more foods can be raised. The water-power in certain of the mountain valleys near the margin of the desert and in the canyons within the desert makes possible the generation of electricity for light and power in the cities and towns.

Mining in this region will certainly continue to develop, and with the constant extension of railroads more and more of the mountain ranges will become easily accessible, and this will make it possible for poorer grades of ore to be mined at a profit.

The dry farming in eastern Washington and Oregon has not reached its limit. It will undoubtedly be increased, thus adding to the crop yield of the region.

Washington is the gateway to Alaska. With its excellent harbor and shipping facilities there is promise of great development in the entire Puget Sound region.

Problems and review questions. 1. Why do more people live in the southern portion of the plateaus than in the northern portion? 2. What do the native people do there to make a living?

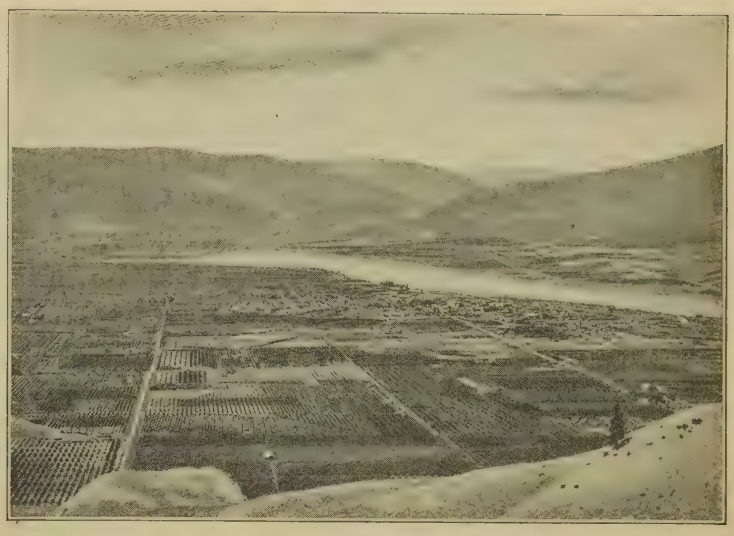

Fig. 132. The city of Wenatchee, Washington, is situated on the banks of the Columbia River. The broad, river-made plain is used as orchard land. The rainfall is under twenty inches a year, which is much less than the fruit trees need, and therefore all the orchards are irrigated

3. Why did the ancestors of these native people build their homes in caves, on the tops of mesas, or on the cliffs of the canyons? 4. Why is there so little rainfall in this region? 5. How does the dryness of the area affect the changes in temperature from night to day?

6. What is the coldest time in the twenty-four hours? Why? 7. What has the Federal government done to help the farmers who live in the Western Plateaus? 8. How was the Columbia Plateau made? 9. What is meant by the Great Basin region? 10. In which plateau is the Grand Canyon?

11. What have you ever seen that is higher than the walls of the Grand Canyon? 12. How was the canyon made? 13. To what natural regions do the mountains of Arizona and the plateau of southern New Mexico belong? *See map on page 122.*

14. What great natural resources have white men discovered in the plateau region? 15. What factors have controlled the location of the cities? 16. What will help to make this part of the country suitable for larger populations in the years to come?

Fig. 133. The great Roosevelt Dam in Arizona was built by the government to store up the waters of the Salt River for irrigation. The Salt River Irrigation Project is one of the many undertaken by our government to water the dry lands of the West and make them fit for farming

Fig. 134. This is Crater Lake, Oregon. It occupies the huge hole which was left long ago when a great volcanic mountain collapsed into itself. This mountain was one of a range of volcanoes which were built up by many outpourings of hot lava long before man came to live on the earth. The other mountains of the range did not collapse and to-day they are cold, rugged peaks, covered with ice and snow (see Figs. 147, 150). The lava cliffs which form the rim of this lake are a thousand feet high, and rising out of its clear, blue waters is a beautiful little volcanic cone called Wizard Island

PACIFIC MOUNTAINS AND LOWLANDS

Coming of the pioneers. In studying the country west of the Mississippi River we have several times referred to the great rush to California when gold was discovered there in 1848. The trails from the Central Plains westward led the exploring parties through several natural regions to this westernmost portion of the United States. *See map on pages 2 and 3.* Some came in at the south, where the climate was dry and warm, and some crossed the Sierra Nevada and went directly to the mining districts in the mountains. Others, who followed the Oregon trail, came by the Columbia River through the Cascade Mountains to the region where Portland is now situated. The life in the mountainous portion of this region developed most naturally from the discovery of mineral wealth. In the lowland areas the occupations were determined by the conditions of soil and climate.

Fig. 135. These men are at work near Fresno, California, stacking alfalfa hay with the help of a derrick. The dry summers of the central valley of California are especially favorable to alfalfa-growing, and the farmers often cut it three or four times a season. Explain the climate here

Placer mining. The first mines were in the sand and gravel deposits of certain valleys of the Sierra Nevada. Some of the gold is in the form of pebbles or nuggets, but more is in the form of grains as fine as sand. Some of it is a gold dust. The stream deposits that contain the gold must be washed in order to separate the gold from the sand and gravel. This is done by running the deposits through long boxes. The gold is heavier than the sand and gravel and therefore sinks to the bottom

Fig. 136. There are no better dairy farms in the country than those in the central valley of California. The cows in this region have green feed the year round, which is a great advantage to dairying. In what ways do the conditions for dairying here differ from those of New England?

of the boxes, where it is caught and held behind small crossbars. This method is called placer mining.

Vein mining. The prospectors realized that the original source of the gold which they found in the gravels must be somewhere upstream, and they searched through the mountains to find the mineral veins which carried the gold. Many of the veins were discovered, and this led to mining underground. Great shafts were sunk and tunnels driven (Fig. 103). Some of the hills have been honeycombed, and the miners now go thousands of feet down into the earth for the ores.

Climate. The prevailing west winds that come from over the Pacific Ocean to the northern portion of the Pacific coast bring an abundance of moisture, and the rainfall is heavy, reaching 100 inches a year on the western slopes of the mountains in Oregon and Washington. Farther south the rainfall decreases, and in southern California it is often very light. During a part of each year the winds of southern California come from over the land and bring little or no rainfall to the coastal region. They come from a very dry region.

Fig. 137. This man is picking grapes in his vineyard in the valley of California. These grapes will be dried to make raisins. Why is the valley of California a favorable place for the cultivation of vineyards? Where are the other grape-raising centers of the United States?

The winds that come from over the Pacific Ocean have the temperature of the air over the water, and as that changes but little from summer to winter, there are not such great ranges in temperature along the coast as there are farther inland.

In the lowland area the climate is never very cold. The rainy season is during the winter, when the upper air is colder; thus, as the winds rise to cross the mountain, they are more quickly chilled and forced to give up their moisture. In the high mountains the winters are cold and there are heavy snowfalls.

Agriculture. In the early days the number of miners increased rapidly and more food was needed. This led many people to begin farming and fruit-raising on the rich soils in the lowland belts between the great mountain ranges (Figs. 135, 136). In southern California the soils are exceedingly fertile, and with the help of irrigation large crops are raised. The lowlands as they appear on the map do not look extensive enough to be as important as they are; but in the valley of California, shut away from the Pacific Ocean by the Coast Ranges, the climate is just right for raising grain and fruit. In the north, barley, rice, apples, pears, peaches, and grapes are the chief products (Fig. 137). In southern California, plums, apricots, oranges, lemons, olives, figs, walnuts, and almonds are produced (Fig. 138). The abundant rainfall on the mountains furnishes sufficient water for irrigating the lowlands, and in the valley of California and in the southern part of the state, irrigation is carried on by the most modern methods.

Drying fruits. Since the rainfall is light, especially in the southern portion, fruits may be dried out of doors. The long days of sunshine are just what is needed to dry plums and grapes into prunes and raisins.

Few places in the world have a climate and soil so well suited to the raising and drying of fruits as the central and southern portions of California. *See Fig. 139.*

Fig. 138. This picture shows one of the great groves of orange, lemon, and grapefruit trees which are cultivated with the help of irrigation in southern California. These are called citrous fruits. How does the climate of southern California compare with that of the citrous-fruit area of Florida?

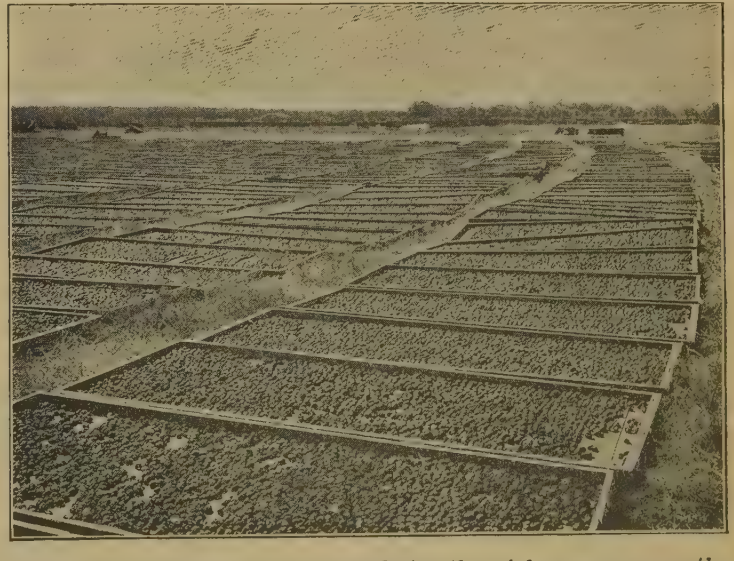

Fig. 139. In the valley of California, during the rainless summer months, acres of land are covered with trays of fruit drying in the sun. The trays in this picture contain prunes. Peaches, pears, apricots, raisins, currants, and berries are also dried in this way. Explain the climate here

MAP STUDIES

Montana. Two natural regions extend into this state and divide it into unequal parts. The Great Plains are in the east. They are used chiefly for grazing sheep and cattle, but along the larger streams, where there is water available for irrigating the land, general farming is carried on.

The western part of the state is mountainous and there great deposits of valuable minerals have been discovered. Between the mountain ranges there are ranch lands and some excellent fruit lands. Compare this map with that opposite page 82.

1. Locate and name at least five mountain ranges in this state. 2. What are the chief mineral resources of Montana? 3. What must be the chief occupations of the people?

4. What large river crosses this state? 5. What national park is entirely within Montana? 6. What national irrigation projects are in Montana?

Great Falls and **Billings.** *See page 57.* **Missoula,** with good railroad connections, is at the northern end of the Bitter Root Valley, which is one of the very fertile fruit-raising districts of the Northwest. Missoula is also the natural outlet of much of the Flathead Valley. It is the home of the state university. **Butte** is one of the greatest mining camps in the world. **Helena,** the capital, was once the most famous mining center of this state.

Wyoming. 1. Into what two natural regions may this state be divided? 2. Locate and name eight mountain ranges that are within or partly within this state. Between the mountain ranges there are fertile valley lands. *See map opposite page 82.*

3. Is there a navigable river in the state? 4. What national park is for the most part in Wyoming? 5. What are the chief natural resources obtained from the ground in this state? 6. Is irrigation practiced here? 7. Name and locate the capital.

Laramie is at the base of the Laramie Range. It is the seat of the Wyoming University and State Agricultural College and is an important supply point. **Sheridan** is a thriving industrial center in a great coal and grazing district. Extensive oil refineries are located at **Casper.** Wyoming is a great sheep-producing state.

Idaho. 1. Describe briefly the surface features in the two natural regions of this state. *See map opposite page 82.* 2. Is there a navigable river in the state? 3. What are the chief mineral resources?

4. What must be the chief occupations of the people of Idaho? 5. What source of power is there in this state? 6. Is irrigation practiced here?

Boise, the capital, is in a rich mining district and is the shipping point for wool, hides, and fruit. **Pocatello** is surrounded by good agricultural lands and has become the trading and railroad center for a large part of southeastern Idaho.

Washington. In the eastern portion of the state we find a part of the Rocky Mountains and a part of the Columbia River Plateau. To the west of these natural regions in Washington is the Cascade Range; then come the Puget Lowlands; and between those lowlands and the Pacific Ocean are the Coast Ranges (Olympic Mountains in Washington).

This state is fortunate in having a large variety in its surface features. The abundant rainfall on the western mountains assures an excellent growth of timber and furnishes water-power and water for irrigating portions of the semiarid plateau east of the mountains.

Puget Sound is a large estuary where the land sank and allowed the sea to come in. Here there are several excellent harbors.

1. Make a list of five high peaks in this state and write down the correct elevation opposite each one. *See Fig. 147.* 2. What navigable rivers are there in this state? 3. What is the leading city of the eastern part of Washington? *See page 68 and Fig. 129.*

4. Why has Seattle had a wonderful growth? Name and locate the other cities on Puget Sound. 5. Name and locate the capital. 6. What are the chief products of Washington? 7. Where is irrigation practiced? 8. Locate on the map the area where dry farming, referred to on page 69, is carried on. 9. Why is the Yakima valley a great fruit-producing district?

10. With what countries is most of the foreign commerce? 11. Are the imports chiefly raw materials or manufactured products? 12. What are the chief exports? 13. What part of the state is most densely populated? Why? *See map on page 82.* 14. What national park is in this state? Where is it located? *See Fig. 156.*

Oregon. West of the plateau, or eastern part of this state, are the rugged Cascade Mountains. In the south these mountains extend westward to the Coast Ranges. In the north, between the Cascade Mountains and the Coast Ranges, there is the lowland of the Willamette River.

1. What part of the state appears to be most attractive to people? Why? 2. Look up the distribution of population and of rainfall on the maps on page 82. Where must irrigation be practiced? 3. What navigable rivers are available?

4. What is the chief port of Oregon? *See page 78.* 5. What sources of power are there in this state? 6. What are the chief products of this state? 7. What are the chief occupations of the people? 8. Name and locate the capital. 9. What national park is in this state? Where is it located? *See Fig. 134.*

GENERAL QUESTIONS

1. What states are included in this group? 2. What sources of power are there in these states? 3. What part is the least densely settled? Why? *See map on page 82.* 4. What are the chief products of the plateau districts in the states of this group?

5. What are the chief products from the mountains? 6. Is Duluth or Seattle the farther from the equator? 7. Is Peking as far north as Portland? 8. Is Vladivostok as far north as Portland? 9. Through how many degrees of longitude does Montana extend? 10. What is the flying distance from Seattle to San Francisco? from Salt Lake City to Seattle?

Home work. On your outline map of the United States color the boundaries of these states. Name and locate the state capitals and the chief seaports. Read about our national parks.

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Fig. 140. This is a typical scene in the Pacific Northwest. The square-rigged sailing vessels are lying at anchor in the river, waiting to be loaded with timber for foreign markets. To what ports will they sail? What conditions make the Pacific Northwest the finest lumber district in the world?

Lumbering. The forests in Oregon and Washington are the most luxuriant in the United States. They are made up chiefly of fir, cedar, and spruce, and they have made possible the production of large quantities of lumber. In southwestern Oregon there are magnificent forests of northern yellow pine (Fig. 142). Tacoma, Seattle, and Portland are lumbering centers and send lumber to the great cities of the Mississippi Valley. On Puget Sound and on the Columbia River vessels from almost all the countries of the world may be seen taking on cargoes of lumber (Figs. 140, 141).

The mills built to take care of this business have such remarkable machinery that huge logs from six to eight feet in diameter and fifty feet long are used. Such logs enter the mill, are sawed into great beams or into various sizes of boards, and are made ready to ship without having been touched by a man's hand. In these forests large quantities of spruce were cut to build aëroplanes for use in the World War.

On the Coast Ranges west of the Puget Sound Lowland and on the mountains of California there are also large supplies of timber. In California the forests of red wood have furnished excellent lumber for buildings, and in that state are the largest trees in the world (Fig. 143).

Salmon fishing. The cold streams coming from the snow-fields and glaciers in the Cascade Mountains are used by salmon for spawning. The mature fish leave the salt water when they are ready to spawn, or lay eggs, and start up one of the streams. The Columbia River and its tributaries and the small streams that flow into Puget Sound are favorite waters. The eggs are deposited far upstream, and there the young salmon are hatched. They remain in the fresh water until they are a few inches long and then descend to the ocean. The greater part of their lives is spent in sea water, but by a remarkable instinct most of them return to spawn in the same stream where they were born (Fig. 145).

The Indians are skillful in catching salmon in these streams. Sometimes they spear them; sometimes they put traps near the banks of the river. White men use great fish wheels or stretch nets out into the rivers (Fig. 146). If nets are stretched completely across a stream, or if too many nets are placed in a river and kept there, the salmon in the stream are soon killed off. The government has made laws restricting the catching of salmon but providing certain rights for all who engage in this industry.

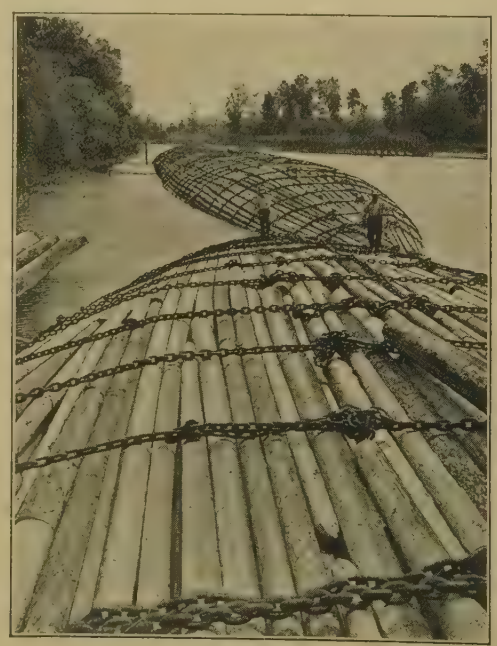

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Fig. 141. When the logs which are cut in the forests of the Puget Sound country must be towed out into the ocean, the lumbermen chain them together in great cigar-shaped rafts

Fig. 142. A northern yellow pine in Oregon, 225 feet high

Oil. Several oil fields have been discovered in California (*see map, p. 76*), and that state has become one of our greatest producers of this very useful fluid (Fig. 144).

Some of the oil comes from rocks that extend beyond the shore under the Pacific Ocean. This has led to a very interesting development of oil wells. Some of them are sunk on the land near the shore; others are drilled beyond the shore line, and in such cases the derricks can be seen rising out of the water. A pipe is put down through the sea water deep into the ground by which the oil can be brought to the surface just as well as if the pipe had been driven down on shore.

Coal. Near Tacoma and at points near Coos Bay there are a number of large coal mines. The coal is in upturned and folded layers of rock, much as it is in the anthracite coal field of eastern Pennsylvania. In this western region, however, the coal has not been made so hard as that in the East, but it is a good grade of bituminous coal.

Fig. 143. These trees are the giant sequoias of California. Some of them are from 25 to 35 feet in diameter and several hundred feet in height. Many are over two thousand years old

Water-power. A second very important source of power in this region is provided by the numerous waterfalls and rapids which are present in most of the mountain streams. In many places hydroelectric plants have been put in and all the large cities have an abundance of electricity.

Harbors. A coast bordered by young, rugged mountains is certain to be without good harbors unless the land sinks and allows the sea waters to enter the mouths of the rivers. Fortunately the land did sink on our Pacific coast, and the salt waters came in through the Golden Gate at San Francisco, at the mouth of the Columbia River, and at Puget Sound. At each of these places the mouth of a river is drowned and bays or estuaries have been formed. This has given the Pacific coast deep, sheltered waters suitable for harbors.

Fig. 144. One of the chief oil fields of California is located near Bakersfield, at the southern end of the central valley. The California oil fields contribute about one third of the total production of the country. Why is it particularly fortunate that California has an abundant oil supply?

The Pacific coast states are all benefiting by commercial relations with foreign countries. There is also some coastwise trade and an active business with Alaska. The opening of the Panama Canal has brought these growing Pacific coast ports into closer relations with all Atlantic ports.

Mountain scenery as a natural resource. The sight of the beautiful mountain panoramas is refreshing to those who must stay in the busy cities in the rush of commercial and industrial life. Some enjoy their vacation outings in the mountains, and many make long expeditions through the canyons and climb to the lofty summits of the range. Camping among the mountains is an inspiration to study and to enjoy nature. Thousands of tourists visit the national parks in this region every year, and many go far into the wild parts of the mountains.

Photograph by Scenic America Co., Portland, Oregon

Fig. 145. This is a chinook salmon jumping a waterfall. Thousands of salmon run up the Pacific coast rivers every year, swimming against the current and jumping the falls. When they reach the quiet headwater lakes they lay their eggs and then drift back down the streams

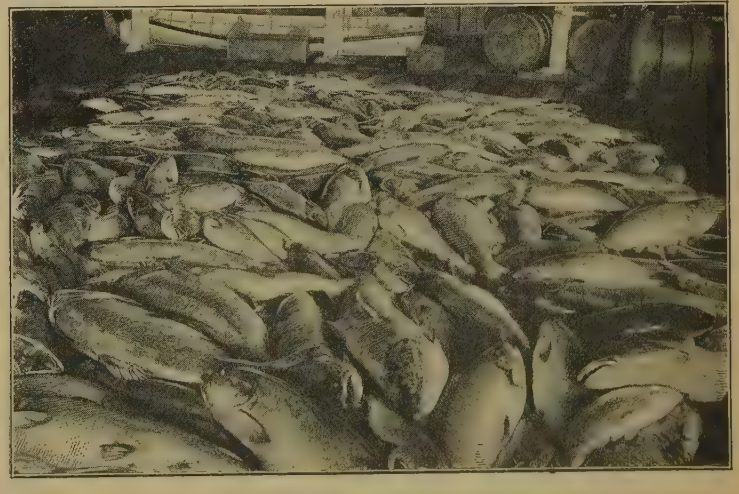

Fig. 146. As the salmon run up the rivers they are caught in great numbers. Here is a boatload of several thousand, the result of one day's fishing. These salmon will be taken immediately to the near-by canneries and put up in tins for export. Where will the canned salmon be sent?

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MAP STUDIES

Colorado. This state is divided naturally into three parts. In the east are the Great Plains, where the rainfall is light. Potatoes, sugar beets, and alfalfa are being raised here on a large scale by the help of irrigation. Colorado produces more sugar from beets than any other state in the Union. Grazing is also important in the eastern part of the state.

The next natural region is the Rocky Mountains. This is an area of magnificent scenery and of wonderful mineral wealth. Here the rainfall is abundant and several large rivers rise among the mountains. Between the ranges there are valleys or parks where ranchmen have located their homes.

In the western part of the state is a portion of the Colorado Plateau. Here the land is from 6000 to 7000 feet above sea level. The climate is semiarid, and irrigation is practiced on a large scale. In the vicinity of **Grand Junction, Delta,** and **Montrose** large quantities of fruit are raised.

Compare this map with the one opposite page 82.

1. Name three large rivers that rise in the mountains of Colorado. 2. Name at least five mountain ranges in Colorado. 3. Name five peaks that rise to elevations of over 14,000 feet above the sea.

4. What national parks are in this state? Where is each one located? 5. Where is irrigation practiced? 6. What are the chief products from the plains? from the mountain area? from the plateau district? 7. Name and locate the capital (Fig. 99).

Colorado Springs and **Pueblo** are two of the larger cities of this state (p. 57). *For mining centers see page 60.*

New Mexico. 1. What natural regions extend into this state? *See map on page 122.* 2. Describe briefly the surface features in each natural region. *Use the map opposite page 82.*

3. What are the chief mineral resources of New Mexico? 4. Name some of the products that must come from the grazing of stock in this state. 5. Is irrigation practiced? Where? 6. Name and locate the capital.

Albuquerque is on the main line of the Santa Fe railroad and is one of the most important trading and shipping centers in the state.

Utah. The Rocky Mountains extend into the northeastern corner of Utah. There the chief ranges are the Wasatch and Uinta Mountains. The former extend north and south and the latter east and west. The balance of the state is in the great intermontane plateau region of the West.

In the southeast is the Colorado Plateau with deep canyons, several small mountain ranges, great natural bridges (Fig. 127), and many other remarkable scenic features. The western part of the state is in the Great Basin, where there are many mountain ranges rising above a plateau surface. *See map opposite page 82.*

Great Salt Lake Desert and more of the lands in western Utah were formerly covered by the waters of an ancient lake called Lake Bonneville. Great Salt Lake is but a remnant of that ancient lake.

1. What part of the state receives the greater amount of rainfall? Why? *See map on page 82.* 2. Where is the population most dense? *See map on page 82.* 3. What must be the chief occupations of the people of Utah? 4. Name and locate the capital (Fig. 130).

Ogden is a very important railroad center. It is at one of the most open western gateways into the Rocky Mountains.

Arizona. The roughest part of this state is the mountainous belt that extends from the northwest to the southeast. These mountains are the northward extension of the Western Sierra Madre of Mexico. What are the chief resources of these mountains in Arizona?

Northern Arizona is a plateau country with the magnificent gorge of the Colorado River cut into it. This part of the state is sparsely populated. A number of Indian tribes live on reservations in the northern and northeastern sections.

Southwestern Arizona is a desert or semidesert area with many low ranges of mountains.

Phoenix, the capital, is in a very prosperous agricultural district. What national irrigation projects are located in this state (Fig. 133)?

Nevada. Most of this state is in the Great Basin. 1. Are there any rivers in this state that flow into the sea? 2. What does become of most of the streams? 3. What are the chief mineral resources?

4. What other products may be obtained from Nevada? 5. What must be the chief occupations of the people? 6. Name and locate the capital. It is in a very important mining district.

Reno is the leading educational center of Nevada and an important trading and manufacturing city.

California. 1. What are the chief mountain ranges of this state? 2. Name and locate the highest mountain in California. 3. Locate Death Valley. How far below sea level is it?

4. What large national parks are in this state? 5. What are the chief products from the mountain areas? from the lowlands? from the desert or semidesert portion of the state? *See rainfall map on page 82.* 6. Name and locate the capital.

Los Angeles is the largest city in California (p. 78). **San Francisco** is the leading industrial city and is also the chief seaport in the state (Fig. 151). **Berkeley** is the seat of the University of California. **Oakland** is a railroad center across the bay from San Francisco. **Pasadena** (p. 78).

GENERAL QUESTIONS

1. Make a list of the great national parks that are shown on this map. In another column show where they are. 2. Where are the driest places in these states? Why are these places the driest?

3. What natural resources have attracted people to the desert portions of these states? 4. What products from these states are shipped eastward? 5. What products of the eastern states are imported?

6. Compare the longitude of Butte with that of Salt Lake City. 7. Is Omaha as far north as Salt Lake City? 8. Is Yokohama as far north as San Francisco? 9. What is the flying distance from Denver to San Francisco? from Salt Lake City to San Francisco? from Los Angeles to San Francisco?

Home work. 1. On your outline map of the United States color the boundaries of these states. 2. Name and locate the capitals and the chief seaport.

Fig. 147. This is part of the city of Seattle, and in the distance, sixty miles away, is Mt. Rainier. Seattle is situated on Puget Sound, and the summit of Mt. Rainier is 14,408 feet above sea level. Locate both on your map. What makes Seattle an important city?

Location and growth of cities. With the development of mining, agriculture, lumbering, and fishing, and the coming and going of people from foreign lands, a number of large cosmopolitan cities have grown up. The chief seaports are shown on the maps (pp. 73, 76). They have the advantages of being inland and on protected waters. Many of the facts regarding the commerce are shown on those maps. **Seattle** (Fig. 147) and **Tacoma** have the advantage of the deep water of Puget Sound, and are both lumber centers. Both are fortunate in having a supply of coal near at hand. A canal at Seattle connects the Sound with a fresh-water lake. Here vessels are cleaned of barnacles, for the barnacles cannot live in fresh water. Seattle is a great outfitting point for people going to Alaska and is the port most commonly reached on the return from Alaska. Most of the supplies for that territory pass through Seattle. At **Bellingham** (Washington) and at **Astoria** (Oregon) there are immense salmon canneries.

Portland is situated on the Willamette River near the Columbia River. These waters are navigable for ocean-going vessels, and Portland is the seaport for Oregon (Fig. 150).

San Francisco is very favorably situated just within the Golden Gate. It is the commercial center and the financial metropolis of the Pacific coast (Fig. 151).

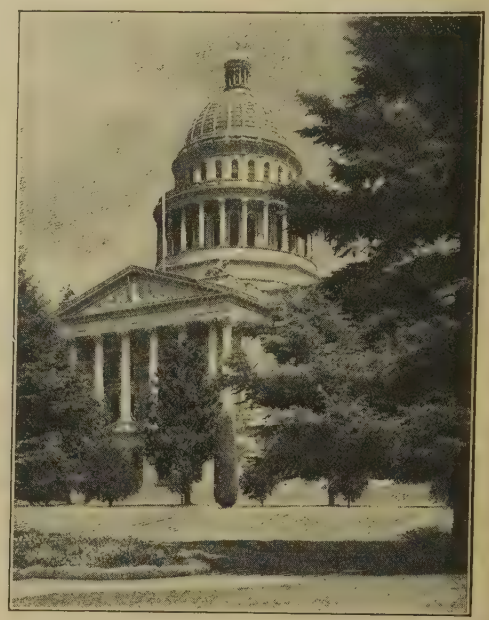

Fig. 148. The state capitol of California at Sacramento is an exceptionally fine example of the domed type of architecture most commonly used for our state and federal buildings

The four principal fruit-growing districts in the valley of California are near **Stockton, Sacramento, Fresno,** and **San José,** but there are several other large fruit-growing districts. In the south, in the lowland bordering the coast, are **Los Angeles** and **Pasadena.** Pasadena is beautifully located near the base of the mountains (Fig. 149). Los Angeles adjoins Pasadena and extends by a narrow strip of land to the coast. It ranks as the largest city in the state of California. These cities are in a great fruit-growing district. They attract large numbers of visitors during the winter.

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Fig. 149. Pasadena is located on lowlands that are composed of sands, gravels, and silts washed out from the mountains by streams. It is an exceptionally beautiful city. The streets are lined with a great variety of tropical trees such as the eucalyptus and palm. The rainfall is light, so the gardens must be irrigated and all the trees and lawns watered frequently. Because the city is situated between the mountains and the sea the climate is always mild, with no extremes of heat or cold. Can you explain this? In this view notice the automobile road which zigzags up the mountain

Fig. 150. Mt. Hood, one of the old volcanic mountains of the Cascade Range, towers like a giant above the surrounding ridges. It is 11,224 feet in elevation. The city in the foreground is Portland, Oregon, the most important city in the state. How far away from Portland is Mt. Hood?

Picture study. *Use Fig. 151.* 1. How should you describe the land surface shown in this view? 2. Has the shore line been elevated or depressed? Give reasons for your answer. 3. To what natural region does this area belong? *See map on page 76.* 4. San Francisco Bay is about fifty miles long and ten miles wide. It is connected with the Pacific Ocean only by the narrow strait of the Golden Gate. What advantage is there in this? 5. How is the bay connected with the valley of California? *See map on page 76.* 6. In what ways is the physical geography of this area favorable to commercial development? 7. What are the chief exports and imports of San Francisco? 8. With what countries does San Francisco trade?

National parks. The Pacific Mountains and Lowlands contain several of the most beautiful national parks in the country. Mt. Rainier National Park surrounds the beautiful peak of the same name, which is remarkable for the twenty-eight glaciers which descend its slopes (Fig. 156). Crater Lake National Park contains the most extraordinary crater lake in the world (Fig. 134). Yosemite National Park is an area of deep valleys, lofty peaks, and cascading waterfalls (Figs. 152, 153, 154). These and the other national parks of the region appear on the maps on pages 73 and 76.

Physical Features

Sierra Nevada. At the eastern base of the Sierra Nevada there is a great crack, or fissure, in the earth. When the mountains were last uplifted, a slipping took place along that crack. The mountains undoubtedly rose very slowly, perhaps a few inches at a time, but they rose to elevations of from 10,000 to 14,000 feet above the sea. Standing on Mt. Whitney (14,501 feet high) one may look down a most wonderful mountain slope into the basin region to the east or view to the north and west a panorama of lofty peaks that extend to the westward until they reach the valley of California.

When this huge mass of land was uplifted, the rivers, supplied with plenty of water by the moist winds from the Pacific Ocean, began their work of cutting it down (Fig. 154). Immense canyons were carved out, and during the Ice Age great glaciers formed in the high mountains and helped to deepen the canyons (Fig. 152).

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Fig. 151. This aëroplane drawing of San Francisco and its surroundings shows the location of the city on a hilly peninsula south of the Golden Gate. Before gold was discovered in California, San Francisco was only a small town, but as the prospectors and miners poured into the state after 1849 it grew very rapidly until to-day it is one of the leading seaports of the United States. How does San Francisco rank among the cities of the United States? *See tables in Appendix*

Fig. 152. Long ago Tenaya Canyon, in the Yosemite National Park, was carved by a river. Then it was widened and deepened by a glacier. To-day its floor is covered with a forest of evergreens. On the right is the great granite Half Dome, rising nearly a mile above the valley floor

Cascade Mountains. The Cascade Mountains, which seem to be a continuation northward of the Sierra Nevada, have been greatly uplifted by earth pressure, and here also the streams and glaciers have been at work cutting into the mountain mass, deepening the canyons, and carrying the loose material to lower levels. There are beautiful glacial lakes and superb waterfalls in these mountains.

Volcanoes. In places in the Sierra Nevada, volcanoes have broken forth. Shasta is a magnificent volcanic cone. It is so high that the upper slopes are covered with snow all the year round, and there are glaciers on the summit. In the Cascade Range there are many more volcanoes (Fig. 156). Lassen Peak was active in 1916 and 1917.

Coast Ranges. The Coast Ranges are even younger than the Cascades and Sierra Nevada. They are not so high as the Sierra Nevada or Cascades, and are still growing. They have in them rock formations which have come up out of the ocean since the glacial period, and this is an indication of extreme youth in mountains. They have also been dissected by streams and by glaciers. On their western edge the waves are now actively at work cutting away the rocks, making sea cliffs, sea caves, and rock islands.

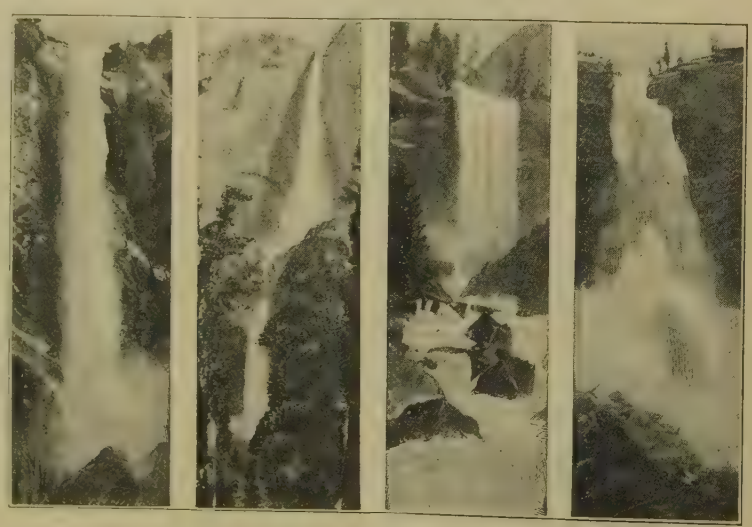


Fig. 154. These are the four great waterfalls in Yosemite National Park. From left to right they are Bridal Veil Falls, 620 feet; Yosemite Falls — upper, 1430 feet, lower, 320 feet; Vernal Falls, 320 feet; Nevada Falls, 594 feet. Of what value are these falls?

The Pacific Ocean side of these ranges shows a series of terraces like gigantic steps, rising to at least 1500 feet above the present sea level. These are benches made by the waves when the land was lower. Each time the land rose, a new bench, or terrace, was cut. The terraces prove that the land was under the sea, and the kinds of sea shells found on them show that they have been but recently uplifted.

Since the last uplifting of the coast the lands have been somewhat depressed, which accounts for the excellent harbors which were described on page 75.

Fig. 153. These jagged peaks are the Three Brothers in the Yosemite National Park. The park, with its steep-walled canyons and cascading waterfalls, is one of the nation's beautiful playgrounds

Earthquakes. The young mountains in this region are still growing, and occasionally, as in all regions of young mountains, the little slippings along the cracks and fissures in the rocks cause earthquakes. There are certain cracks in the Coast Ranges where earthquakes have occurred since the white people settled there. Volcanoes are also commonly located in regions where the mountains are growing.

Lowlands. The lowlands of the Pacific coast region have received the wash from the mountains on each side. Sands, clays, and gravels and some glacial materials have been deposited here, making rich soils (Fig. 157).

Future. The natural resources are varied and abundant and will lead to a greater prosperity. With the development of the nations in eastern Asia and the steadily increasing trade with Australia and New Zealand our Pacific coast states are sure to continue their rapid growth.

About fifty years ago Japan began to use modern industrial methods and has since developed rapidly in that direction, until now it is a great world power. China is just entering upon a period of internal development. Many of the valuable natural resources of that country have as yet been little used. The Chinese have lived chiefly as an agricultural people. They have great resources of coal, oil, and iron and many other metals. These resources are now being used and factories have been built for the manufacture of cotton, silk, flour, iron and steel, and other products. Industrial development will undoubtedly lead to increased commercial intercourse with the Pacific states.

Docking facilities on the Pacific coast must be enlarged. The history there will be somewhat like the history of the Atlantic seaports, where it has been difficult to build enough wharves to meet the ever-

Fig. 155. This is the beautiful canyon of the Columbia River. The river rises east of the Pacific Mountains and is the only one which cuts its way across them to the ocean. Study the map on pages 2 and 3 and explain the importance of the Columbia in the westward expansion of the American people

increasing demand. With more foreign trade will come the necessity of more extensive railroad service for transporting imports and exports. A larger population will be needed to care for this business and to supply food for all who live in the region. Much of this growth will certainly take place in the next half-century.

Problems and review questions. 1. What first led exploring parties into the Pacific Mountains? 2. By what routes did the early explorers reach California? 3. What is meant by "placer mining"? 4. Tell briefly the story of a gold nugget from the time it was in a mineral vein until it was found by a prospector. 5. What sources of power are there within this region? 6. Where did the soils on the lowlands come from? 7. Why is so much fruit dried in California?

8. Describe briefly the life of the salmon. 9. What conditions are favorable to the development of lumbering on a large scale

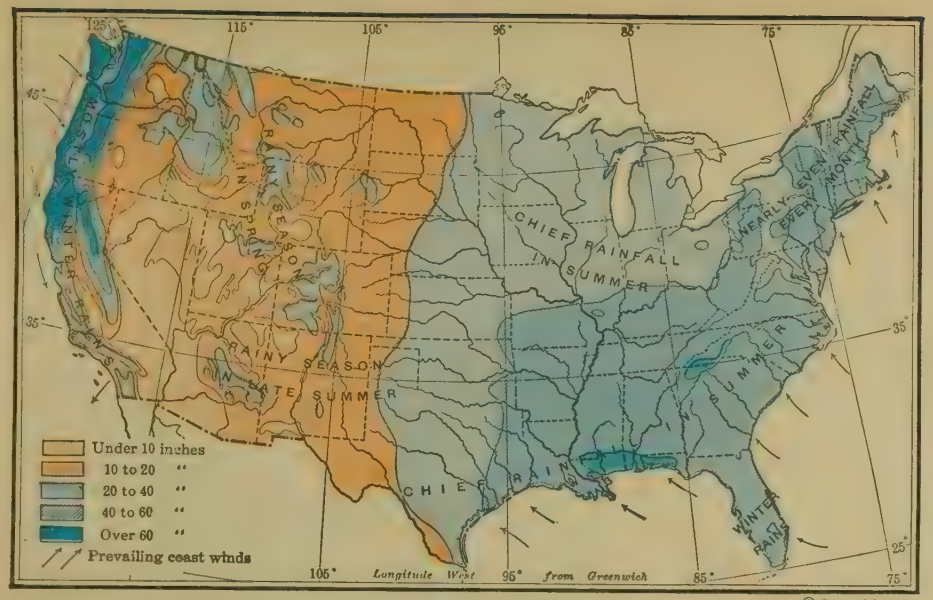
Fig. 156. This view of Mt. Rainier from Mirror Lake shows its rugged slopes covered with ice and snow. It has more glaciers than any other peak in the United States. Many of them are from four to six miles long, and they extend in all directions from the summit to the base

in Oregon and Washington? 10. Name the chief seaports in this region. 11. What different mountain ranges are included in this region?

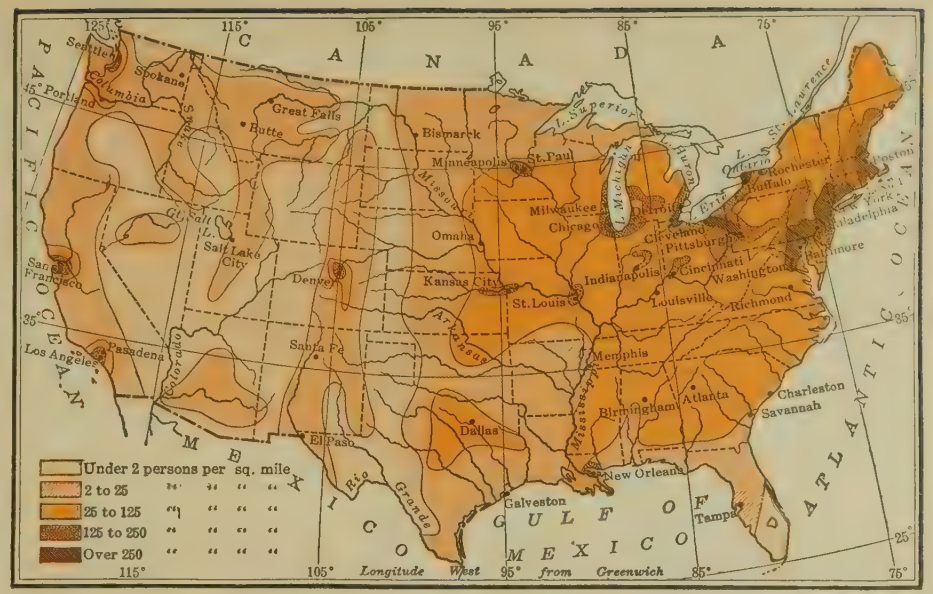
12. What grains are raised in the valley of California? 13. What fruits are raised in California? 14. What is the explanation of the formation of Crater Lake? 15. Where should you go in this part of the United States to see a glacier? 16. Explain the presence of Puget Sound and San Francisco Bay on the Pacific coast. 17. What signs are there that the mountains of this region are still growing?

18. What city on the Willamette River near the Columbia may be called a seaport? 19. With what countries is most of the trade from Seattle and Tacoma? 20. What are the chief imports from China and Japan to this country? 21. Explain the presence of forests in the mountains of the Pacific coast states.

Fig. 157. Looking out over the gently rolling lowland of the Willamette River it seems as if the valley were one great orchard. Rows of apple, pear, prune, and peach trees alternate with acres of strawberry plants and berry bushes. Why is the Willamette Valley so favorable for fruit-raising?



Average annual rainfall in the United States



Distribution of people in the United States

COMPARATIVE MAP STUDIES

1. Test your knowledge by locating each of the following on the relief map: Appalachian Highlands, Coastal Plains, Interior Highlands, Central Plains, Great Plains, Black Hills, Rocky Mountains, two great plateaus, Sierra Nevada, Cascade Mountains, Pacific Coast Ranges, Laurentian Uplands, Continental Shelf, Mexican Plateau, Western Sierra Madre, five large rivers, a large delta, a cape, an estuary (or drowned river mouth), a desert, a semidesert region.

2. What portions of the United States have forests? 3. Are the forests more commonly near the coasts or far inland? Why? 4. Why are the forests in the Great Plains region limited to the stream courses? 5. Is there a tropical forest in the United States? If so, where?

6. Where are most of the open grasslands in the United States? Why? 7. What is meant by "wet-weather streams"?

8. What are the prevailing winds along the Pacific coast? 9. Explain the heavy rainfall along the Pacific coast north of San Francisco. 10. Explain the heavy rainfall in portions of the Rocky Mountains. 11. Explain the desert conditions east of the high mountains of the Pacific coast. 12. Why is the western portion of the Great Plains poorly watered?

13. Why should the southern Appalachian Mountains have more rainfall than the lands to the east or west of them? 14. Which part of the country has the warmer climate? Why? 15. Why is there a dry climate in southern California?

16. Name certain states you would select if you wanted to go into farming; fruit-raising; cattle-raising; mining; lumbering; or if you wanted to farm by irrigation.

17. Where are lakes most numerous? Why? 18. Why should some of the lakes in the western plateau region be salty? 19. Study Fig. 126 and locate the canyon of the Colorado River on the relief map.

20. Judging from the depth of water surrounding the United States, where should you expect good conditions for catching salt-water fish?

21. Pick out a route for a canoe trip, starting in Canada and ending at the Gulf of Mexico, with only one portage, and that a very short one during a wet season.

22. To what part of the United States should you go to see high mountains? to see a desert? to see wonderful forests? to catch mountain trout? for a warm climate in winter? for the best chance for winter sports?

23. In what parts of the United States is the population most dense?

24. Why should there be so many more people in the eastern portion of the United States than in the western? 25. Explain the very dense population in each of the areas where there are more than 250 people to the square mile.

26. Explain the somewhat dense populations in each of the areas where there are from 125 to 250 people to the square mile.

27. Which of the lowland areas of the United States is most densely populated? Why?

28. Explain the sparse populations in each of the areas where there are less than two people to the square mile.

29. What large cities have developed on the great rivers? 30. What large cities have developed on the Great Lakes? 31. What large cities have developed on the seacoasts?

32. Why should such places be favorable to the growth of cities? 33. What type of vegetation appears in Canada that does not appear in the United States? Why?

UNITED STATES
AND
NEIGHBORING LANDS
Scale of miles
0 100 200 300 400
Water less than 500 feet deep
Wet-weather streams
Tundra
Grasslands
Temperate forests
Tropical forests
Semideserts
Deserts and barren mountain slopes

Fig. 158. Some years ago the United States government introduced reindeer from Lapland into Alaska. Many of the Eskimos of Alaska have now learned to care for reindeer as farmers care for cattle. The Eskimos in this view live at Cape Prince of Wales. They have harnessed their reindeer to sleds and are hauling reindeer meat to market at Nome. How many miles is it from Cape Prince of Wales to Nome? What will these Eskimos buy at Nome in exchange for their meat? Why do the Eskimos keep reindeer instead of cattle? How many different uses of the reindeer can you name?

2nd term

POSSESSIONS OF THE UNITED STATES

ALASKA

An investment. In 1867 we purchased Alaska from Russia for $7,200,000. Many people thought we paid too high a price. Since then we have taken from Alaska over $300,000,000 worth of gold, more than $6,000,000 worth of silver, many million dollars' worth of copper, and some tin. Billions of tons of hard and soft coal have been discovered there. We are now taking millions of dollars' worth of fish from the Alaskan waters each year, most of which are salmon.

In southeastern Alaska there are large forests, wonderful waterfalls, and such beautiful scenery that thousands of people take the boat trip to Alaska just to see the mountains, the long fiords, and the glaciers.

Home work. In Bancroft's "History of the Pacific States," or elsewhere, read about Bering's discovery of Alaska.

Climate. The winds from the Pacific Ocean bring an abundance of moisture to the coastal region of southern Alaska. *See map on page 124.* They blow over waters of the ocean that have been warmed by the Japan current, and they therefore keep the Pacific coastal region from ever being extremely cold.

During the summer season a temperature of 95 degrees in the shade is sometimes reached in the interior of Alaska and even as far north as the arctic circle, and some prefer to work at night rather than during the day, because it is cooler when the sun is low. The winter temperature in the interior is very low, — so low that the mercury freezes in the thermometers. In the Far North in summer it is daylight throughout the twenty-four hours. The sun is highest at noon, when it is in the south, and lowest at midnight, when it is in the north. During the winter the days in Alaska are short, and in places the sun does not rise above the horizon for many weeks.

Fig. 159. This is a view of Chilkoot Pass during the Klondike rush for gold. With their outfits on their backs the gold-seekers formed a long line here, pulling themselves up over the mountain by means of a long wire cable

Effects of climate. Many think that Alaska is so cold a country that no one but Eskimos would want to live there, and that the growing season is too short to raise even vegetables. That is not so. To-day there is a population of about 55,000 in this far northern territory. Near each of the larger settlements there are vegetable gardens, and nearly every prospector has a little garden patch beside his cabin. Timothy hay and oats are raised in a few places. Strawberries will ripen. Cattle graze all winter long on certain of the islands near the Alaskan Peninsula, and there are many Pacific coast harbors that are free from ice all the year.

People. When the report was circulated that gold had been discovered in Alaska, miners and prospectors from almost all parts of the world rushed to this new country in the hope of discovering a rich deposit of gold-bearing gravels (Fig. 159). The miners make up most of the population to-day.

Along the Pacific coast there are several Indian tribes. They are industrious and kindly. Many of them work in the canneries, some in the mines, and others in the forests, where lumbering is carried on. In the interior of the country small Indian settlements appear along the banks of the Yukon.

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Fig. 160. These are the rugged coastal mountains along the Alaskan shore. The sharp peak in the middle distance is Mt. St. Elias. Its summit is 18,000 feet above sea level. To the left of it is the great Malaspina Glacier, which extends from the foot of the mountains to the sea

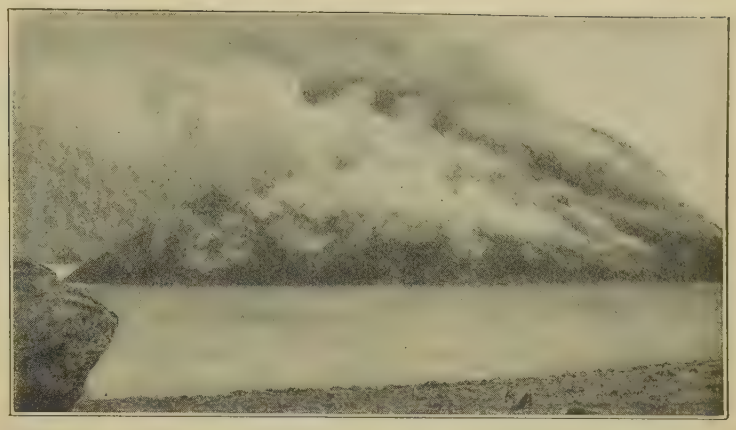

Fig. 161. Perry Island, one of the volcanic mountains of the Aleutian chain, rose suddenly from the sea, and when it was first discovered, steam was escaping from every crack and crevice. Later explosions blew it to pieces, and to-day it cannot be seen. Locate the Aleutian Islands on your map

At Cape Prince of Wales, which is the nearest point in North America to Asia, and from there northward along the coast as far as Point Barrow, there are Eskimo settlements (Figs. 158, 162).

Government. The people of Alaska elect delegates to Congress and have almost complete control of local affairs. Since Alaska is a territory, the governor is appointed by the president of the United States.

Problems and map studies. 1. What are the chief mineral resources of Alaska? 2. Name three important products shipped from Alaska to the United States. 3. What makes the coastal region of Alaska so favorable to the salmon? 4. What are the chief articles shipped to Alaska?

5. Why are there not more people engaged in farming there? 6. What are the chief cities of Alaska? 7. What is the most important inland city? 8. What city is the capital of Alaska? the metropolis? *See Fig. 163.* 9. What is the largest river?

10. Name the northernmost cape. 11. Explain the fiords and islands along the coast of Alaska. 12. What explanation can you suggest for earthquakes?

13. Find the place where the sealskins come from. Study Fig. 164. 14. Who discovered Alaska? *See Appendix, Plate A.* 15. What bodies of water have been named in honor of him? 16. How much did we pay for Alaska? 17. Why should it be very warm in the valley of the Yukon during summer?

18. What ocean current helps to keep the coast of Alaska warm? 19. Explain the heavy snowfall on the coast ranges where the glaciers are formed. 20. Why is there less rainfall in the interior of Alaska than there is along the seacoast?

21. Where do the Eskimos live? 22. Of what value to the Eskimos are the reindeer? 23. How do people travel in the Yukon valley in winter? 24. Plan three sight-seeing trips in Alaska and describe the things you would see on each one of them.

Fig. 162. This Eskimo is paddling his kyak, which he has made by covering a framework of bones with skins tightly sewed together. He wears a sort of raincoat, which, when tied down over the opening in the boat, makes it water tight. In this rig he can ride the roughest waves with perfect safety

Natural Regions

The Pacific coastal region. Bordering the coast there are magnificent high mountains. They are a continuation northward of the mountains in our Pacific coast states, and extend through British Columbia into Alaska and then follow the coast through the Aleutian Islands. These islands are the peaks of a mountain range which extends nearly to Asia (Fig. 161).

The St. Elias Range, as seen from a vessel coasting along the Alaskan shore, is one of the most magnificent sights in the world (Fig. 160).

The Coast Ranges are young and growing mountains. Earthquakes are common in this belt, and there are many active volcanoes. There is one volcanic region which has been appropriately called "the valley of ten thousand smokes." This region has been set aside by Congress as the Katmai National Monument.

This coastal region has a number of excellent harbors, and in the southeastern part of Alaska there is a beautiful inland passageway sheltered from the storms of the Pacific by a series of large islands. **Juneau,** the capital of Alaska, is situated near the northern end of this inland passage.

Mining is the chief occupation in southeastern Alaska, although lumbering and the canning of salmon are important. Whaling stations have also been established here, and there are salmon, halibut, herring, and a few cod fisheries, which provide a living for many of the people.

Fig. 163. Nome, on the Seward Peninsula, was first settled by men who found gold in the beach sands. To-day most of the gold has been washed out, and the mining is farther inland. Nome has no harbor, and vessels must anchor far offshore. Why are there no trees here?

Farther west, in the Prince William Sound district, there are other mining centers. Large quantities of copper have been discovered on the islands in this sound.

Cordova is the terminus of a railroad which follows the Copper River to an important mining district.

Seward is now the terminus of a government railroad which is planned to connect this port with **Fairbanks**, the largest city of the interior. The railroad will pass near one of the great coal fields, and a branch line will go to the mines. When this road is completed, supplies for the miners can be quickly taken to the great gold-mining camps of the interior. It will reduce the cost of living in that part of the country, and will greatly help the development of Alaska. *See map on page 84.*

Home work. On an outline map of Alaska locate Juneau, Skagway, Sitka, Cordova, Valdez, Seward, Eagle, Fairbanks, and Nome. Print in the names.

Yukon Plateau. The next natural region within the Alaskan territory is a broad upland through which the Yukon River flows to Bering Sea. This river rises in Canadian territory. It is over 2000 miles long, and about 1500 miles of its course is in Alaska.

The chief highway of travel in the interior of Alaska is the Yukon River. During the summer large steamers, like those on the Mississippi River, come from **St. Michael** upstream as far as **Dawson** (Fig. 166). Some go up the Tanana to a point near Fairbanks. When winter comes, the river freezes over; but it continues to be the highway of travel, for during that season dog sleds are used, and with the help of the dogs there is a regular winter delivery of United States mail through this vast land.

Gold has been found in the stream gravels in the valleys of the Yukon and Tanana rivers and in almost all of their tributaries.

The plateau is a region of light rainfall. Grasses, mosses, and many flowers grow on the upland areas, and trees border the main stream courses. Most of the flowers have short stems; in places there are millions and millions of blossoms.

Fig. 165. This man is starting out alone to prospect for gold in Alaska. He has with him his tools, food, bedding, gun, and fishlines. Why has he a net over his face?

In the interior of Alaska the ground thaws out to a depth of about eighteen inches during the summer season. Below that it remains frozen year after year.

Endicott Range. North of the Yukon Plateau, and extending from the northern extremity of the Rocky Mountains to Bering Strait, is a range of mountains that have been but little visited by white men. The mountains are known to have rugged peaks with snowfields and glaciers. No one lives there, and as yet little prospecting has been done in that part of Alaska.

Arctic Coastal Plain. Still farther north, extending from the foothills of the Endicott Range to the ocean, is a gently sloping lowland which in form is much like the Coastal Plain east of the Appalachian Highlands or bordering the Gulf of Mexico. Here the rainfall is scanty and the vegetation is chiefly moss and grasses. The ground is frozen most of the year and thaws only a few inches at the surface during the summer season. Such a place is called a tundra. *See map opposite page 124.* The only inhabitants of this region are a few Eskimos who live near Point Barrow, about 300 miles north of the arctic circle.

Fig. 164. Far off in Bering Sea, west of Alaska, there are a few islands which the fur seals use as their summer home. This particular place is known as Kitovi Rookery, St. Paul Island. Where do the fur seals spend their winters?

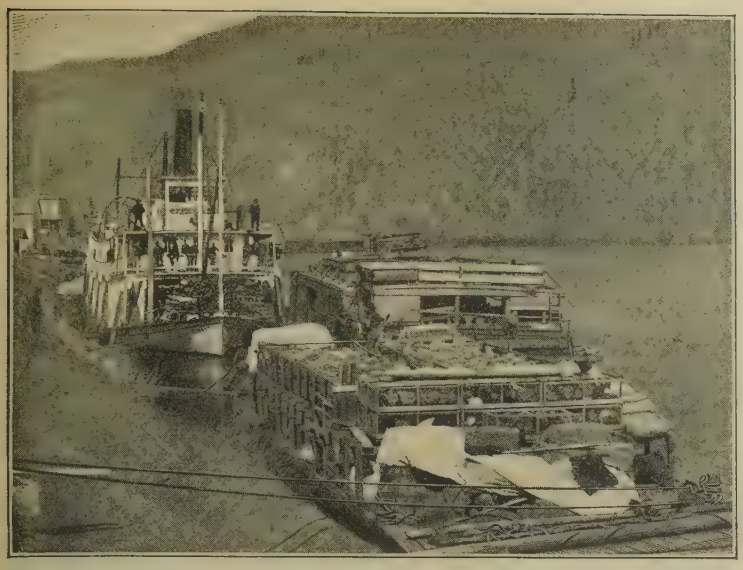

Fig. 166. This is one of the Yukon River boats which bring supplies into the interior of Alaska every spring after the ice melts. The boats are stern-wheelers, and so the freight barges have to be tied to the prow and pushed. What supplies do the people in Alaska need? Why?

HAWAIIAN ISLANDS

Physical features. The Hawaiian Islands are volcanic peaks which have come up from the ocean bed. There are eight principal islands and many smaller ones, having a combined area less than that of the state of New Jersey. On the island of Hawaii, which is the largest in the group, the mountains have risen to a height of over 14,000 feet. Mauna Loa and Mauna Kea are the two highest of these volcanoes. On the slope of Mauna Loa is the tremendous crater of Kilauea (Fig. 169). The summit of Mauna Loa and the crater of Kilauea are national parks.

Climate. Since these mountain peaks rose in the torrid zone, in the midst of a great ocean, they have a warm climate with but a slight change in temperature from summer to winter. The winds are the northeast trades, and they bring plenty of rainfall to the windward side of the mountains. The precipitation reaches 75 inches a year on that side, but on the southwest, or leeward, side the annual rainfall is less than 25 inches. One side of an island is therefore well wooded, while the other side is a semidesert.

The people and their occupations. The population of these islands is about 200,000. The native Hawaiians belong to the brown race. They are an intelligent people but have been decreasing in numbers. White people have invested money in the development of the plantations, and a great many people from Japan, China, and the Philippines have gone to the islands to work. Sugar cane is the chief crop. Pineapples, coffee, rice, bananas, tobacco, and citrous fruits are also raised (Fig. 167).

The location of these islands is fortunate, for the ocean routes from our Pacific coast ports to New Zealand, Australia, the Philippines, China, and Japan naturally pass near the Hawaiian group. They are sometimes spoken of as at the "cross-roads of the Pacific." They are used as a coaling station, and large reserves of coal are held there for the United States Navy. Vessels may put in at these islands to make repairs.

Cities. Honolulu, on the island of Oahu, is the capital and largest city. It has a good harbor and is the chief port of the territory (Fig. 168). The next largest city is **Hilo,** on the island of Hawaii.

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Fig. 167. The finest pineapples in the world are grown on the Hawaiian plantations. Thousands of them are canned and sent to the United States. What other products do the Hawaiians raise?

Government. In 1893 the white people took control of the government of the Hawaiian Islands and in 1898 offered them to the United States. These islands now constitute one of our territories.

Problems and map studies. *Use map on page 84.* 1. Where are the Hawaiian Islands? 2. Why is the climate of the islands so mild? 3. What winds bring rain to the mountains? 4. How were the islands made? Give proofs. 5. What are the chief imports? 6. What are the chief exports?

7. Why are these islands spoken of as at the "cross-roads of the Pacific"? *See Appendix, Plate B.* 8. Plan a trip from your home to Honolulu. 9. How should you reach your port of departure? 10. How long should you be on the ocean? 11. In what occupations should you expect to find the Hawaiians engaged? 12. What places of interest should you wish to visit?

Fig. 168. Honolulu, the capital of Hawaii, has a safe, deep harbor where the largest ocean-going vessels can anchor. It is an important port of call for ships engaged in trans-Pacific trade. From what countries do these ships come? What do they bring to Honolulu? What do they carry away? Why are the Hawaiian Islands such valuable possessions of the United States?

Fig. 169. This is a photograph of a model of Kilauea, the active crater on the eastern slope of Mauna Loa. The circular pit in the foreground contains a lake of boiling lava. Surrounding it is the great floor of hardened lava, built up by many outpourings of hot liquid rock

PANAMA CANAL ZONE

Ever since 1513, when Balboa climbed to the top of a hill on the Isthmus of Panama and looked off over the Pacific Ocean, men have talked of a water route through this narrow neck of land. France was the first country to attempt the construction of such a canal, and in 1880 Ferdinand de Lesseps, the engineer who built the Suez Canal, began the work. This project failed because those in charge were unable to prevent the spread of tropical diseases among the workmen.

In 1904 the United States acquired from the republic of Panama a narrow zone through the Isthmus (Fig. 172). Our purpose in securing this zone was to construct a canal for large ships from the Atlantic to the Pacific Ocean.

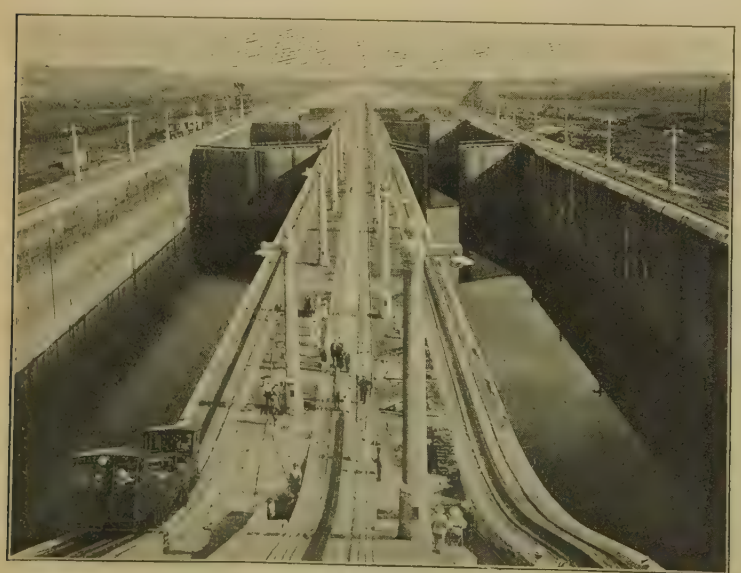

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Fig. 170. These are the Gatun Locks of the Panama Canal. They are three great water steps by which ships are lifted from the level of the Caribbean Sea to Gatun Lake. The locks are large enough for the largest vessels afloat. At the left is one of the electric locomotives used for towing

Never before in the history of the world has man attempted a task so large or so difficult as the construction of this canal. There were three chief difficulties: (1) a range of hills which separates the two oceans; (2) great seasonal floods in the Chagres River; (3) tropical diseases. The line of hills has been pierced by the Gaillard Cut, which is 250 feet deep (Fig. 171). To control the Chagres River the Gatun Dam was constructed, which has caused the formation of Gatun Lake, the largest artificial lake in the world (Fig. 172). The

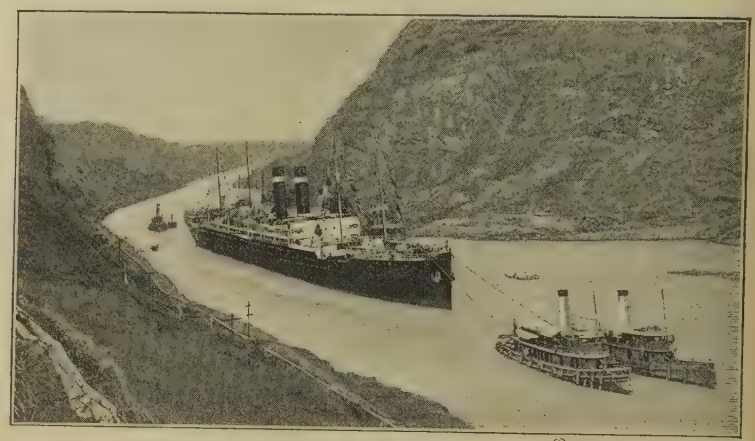

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Fig. 171. This great steamship is being towed through the Gaillard Cut. Across the canal is Gold Hill, which has caused the blocking of the canal several times by slides from its slopes. The Gaillard Cut was made through the mountainous backbone of the Isthmus, and was a very hard problem for the engineers who constructed the canal

problem of fighting tropical diseases was very difficult. Forests and underbrush were cleared away, oil was spread upon the waters of the marshes and swamps to prevent mosquitoes from breeding, sanitary conditions were greatly improved, and every care was taken to prevent the spread of any contagious diseases which appeared among the workmen.

About 260,000,000 cubic yards of material were handled in the construction of the Panama Canal. That amount of material would build a wall around the District of Columbia 60 feet thick and a little over 500 feet high. If the material could be piled up around the earth at the equator, it would make a solid wall six feet thick and about nine feet high.

The level of Gatun Lake, through which the canal route passes, is about 85 feet above the sea. That necessitated a series of locks near each end of the canal. With the help of electric motors at these locks a vessel may now pass from one ocean to the other in about ten hours (Fig. 170). The route of the canal through the lake is marked by buoys that are brightly lighted at night.

Colon, the Atlantic terminal, is a supply station. Here ships can obtain almost anything they need. Storage bins for coal, machine shops, bakeries, and ice plants have been established at this terminal.

The Pacific terminal of the canal is Balboa. It is fitted up as a repair station. With huge machine shops and modern dry docks, **Balboa** stands ready to receive any ship that needs repairing after its trip through the canal.

By means of the canal the Pacific coast ports of North America and South America may easily be reached from all Atlantic seaports. The opening of the Panama Canal shortened the water route from New York to San Francisco by 8000 miles and made all of our island possessions in the Pacific Ocean more valuable. The United States government has fortified the canal, but it is open for the use of vessels of all nations.

The canal is also of great advantage to the countries of western Europe, shortening the distance between their Atlantic ports and the Pacific ports of North and South America by thousands of miles.

Home work. 1. Make a diagram showing the length of the canal, the height of Gatun Lake, the location of the locks at each end, and the location of Colon and of Panama. 2. Which end of the canal is farther west? 3. Find out how electric motors help vessels through the canal.

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Fig. 172. This is a view of the Panama Canal Zone, showing the mountainous country through which the canal was cut. The Canal Zone (shown by the darker shading) is 10 miles wide and 50 miles long from deep water at Colon to deep water in the Gulf of Panama. The narrowest width of the canal is 300 feet, and its shallowest depth is 41 feet. The highest reach of its water surface, from the Gatun Locks to the Pedro Miguel Locks, is 85 feet above sea level

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Fig. 173. This is the city of Panama, near the Pacific end of the canal. Can you explain how it is that the Pacific end is the eastern end of the canal?

Problems and review questions. 1. About how long is the Panama Canal? 2. How wide is the Canal Zone? 3. How was the Gatun Lake formed?

4. Of what advantage is the lake? 5. How is the canal route through the lake marked? 6. How high do vessels rise above sea level in crossing the Isthmus?

7. How long does it take for vessels to pass from ocean to ocean through the canal? 8. What difficulties had to be overcome in building the canal?

9. What was done to prevent the spreading of tropical diseases? 10. What South American countries are most benefited by the canal? 11. How did the opening of the canal increase the value of our Pacific islands? 12. What did it do for Europe?

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Fig. 174. This motor truck, loaded with Porto Rican sugar cane, is bound for the sugar mill. The sugar used to be hauled to the mills in oxcarts in Porto Rico and Cuba, but gradually motor trucks are taking their places. Why are motor trucks better for this purpose?

PORTO RICO

Porto Rico is in the torrid zone and is one of the four largest islands of the West Indies. In many ways it is a delightful place to live in, and certainly a most attractive island to visit. The central portion is mountainous, and about the margin are the lowlands, which have been divided into farms. Many of the lower slopes of the mountains are cultivated.

About three fifths of the people are white and the other two fifths are negroes or people with mixed blood (Fig. 177).

Porto Rico is not quite as large as the state of Connecticut; it has a population of over a million. The island was ceded to the United States by Spain in 1898. At that time the great mass of the people were uneducated.

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Fig. 175. Many of the broad, rich valleys of Porto Rico are used for raising tobacco. Large areas of the tobacco fields are covered with white cheesecloth, which protects the plants from insects and the intense heat of the sun. Scattered over the fields are the sheds where the tobacco is dried

There are many to-day who cannot read or write, but a system of free public schools has been established, and every effort is being made to have the children attend school at least a part of each year.

Climate. The high temperature of this region is weakening, especially to white people. They must learn to work less vigorously than they would in the temperate zone, and plan to have a great deal of help. On the lowlands there is never frost or snow. The prevailing winds are the northeast trades. As the moisture-laden winds strike the mountains and rise, the rain falls on the windward, or northeast, side. The leeward, or southwest, side is dry,—a condition which we have discovered in many places where winds pass over mountains and descend. On the dry side of the island irrigation is necessary to assure full and regular crops. The rainy season is in summer, when the equatorial rainy belt moves northward with the apparent movement of the sun.

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Fig. 176. San Juan was a sleepy old Spanish town until 1898, when Porto Rico became a United States possession. Now it is a busy modern seaport. Can you explain the change?

Products and occupations. The chief product is sugar, of which the island exports each year approximately 500,000 tons. It constitutes over 50 per cent of all the products exported (Fig. 174). Cotton, coffee, tropical fruits, and tobacco are among the other products (Fig. 175). Some of the fruits, especially pineapples, are canned before they are shipped. Great quantities of vegetables are raised on the lowlands of Porto Rico. They ripen during the winter months and are sent directly to the markets of the United States.

Although most of the people in Porto Rico are engaged in agriculture, there is a little manufacturing. Cigars and cigarettes are made. Large numbers of them are used by the Porto Ricans, but a great many are exported.

In some ways the United States is fortunate in having possessions in the tropics and in having commercial relations with many other tropical countries, for from those lands we secure products which we cannot raise in abundance at home.

Railways. Since the United States took control of Porto Rico, over 1000 miles of roads have been improved, and about 300 miles of railway constructed. The main line of travel is on the lowlands about the margin of the island. *See map between pages 117 and 120.*

Cities. The two largest cities are **San Juan** (Fig. 176) and **Ponce**. San Juan, the capital, is on the north side, and Ponce is on the south side. They are now connected by a railroad which runs around the west end of the island.

Government. The governor of Porto Rico is appointed by the president of the United States, but most of the local affairs are entirely under the control of those living on the island. The citizens over twenty-one years of age, both natives and Americans, who have lived there for a year, have a right to vote. The voters elect most of their local officials and a commissioner to the United States, who represents Porto Rico in Congress.

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Fig. 177. This is a typical negro family of Porto Rico. Their little house is built of boards and thatched with straw. Back of the house is the banana patch from which they get most of their food

THE VIRGIN ISLANDS

The Virgin Islands, which the United States purchased from Denmark, lie about 50 miles east of Porto Rico and have a combined area of 142 square miles. Compare this with the area of the smallest state in the Union and with the area of Porto Rico.

These little islands are in the belt of the northeast trades, where it is always warm. When the winds strike the mountains, rain falls, so that the northeast sides, as in the case of the other islands in the West Indies, are well watered. Most of the rain comes in summer and early fall.

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Fig. 178. This street in St. Thomas is made of steps. The city is built on the slopes of three mountains overlooking the harbor, and the steep streets climb straight up the hillsides

The islands are the tops of mountains, but near the coast there is enough low land for large crops of sugar and cotton, which are the two leading products. Trade is increasing constantly between the islands and the United States. The population of these islands is about 32,000. Of the three islands, **St. Thomas** is the most important commercially. This is due to its advantageous position. The island is located directly on the sailing route between the ports of Europe and the entrance to the Panama Canal, and also on the line of communication between North and South America. Its one town, **St. Thomas** (Charlotte Amalie), is located on the lower slopes of three mountains, overlooking one of the best harbors in the West Indies, and it is the port from which the agricultural products of the surrounding islands are shipped to other parts of the world (Figs. 178, 179).

St. Croix and **St. John**, the other two islands of the group, have rich soils on which excellent crops of sugar, cotton, coffee, tobacco, and tropical fruits are raised.

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Fig. 179. This is St. Thomas, the port of St. Thomas Island, one of the three Virgin Islands which the United States bought from Denmark in 1917 for $25,000,000. St. Thomas has a landlocked harbor large enough to shelter 200 vessels. Why are the Virgin Islands valuable to the United States?

Problems and review questions. 1. How did the United States come into possession of Porto Rico? of the Virgin Islands? 2. Why should these islands have warm climates with plenty of rainfall for agriculture on the northeast sides? 3. Why should they be drier on the southwest sides?

4. Should you expect the mountainous portions to be forested? *See map on page 124.* 5. Why are the native Indians and the negroes very useful on the islands? 6. At what season of the year should we find a visit to Porto Rico most enjoyable?

7. What foods should you probably find in abundance throughout the islands? 8. Of what advantage is it to the United States of America to have island possessions in the tropics? 9. What are the chief articles that the people on these islands wish to purchase from us?

Fig. 180. These Philippine girls are grinding corn in a simple hand mill made of two stones. The corn is ground while it is fresh, for the people of the Philippines do not like it dried

Fig. 181. Some of the people of the Philippines live in tree houses like this. They climb up to the house by a ladder which they pull up after them for greater safety

Courtesy of Bureau of Public Works, Manila

Fig. 182. This is one of the beautiful little horses for which the mountainous province of Abra, in northern Luzon, is famous. These horses are rather small but very sturdy and strong

PHILIPPINE ISLANDS

The Philippines are the tops of mountains which rose from the sea bottom until their summits were out of water. In places the great folds in the earth broke open and volcanoes came into existence. Along the cracks and fissures in the mountain masses little slips take place from time to time, causing earthquakes. These mountains are therefore young and are still growing. Many of them now rise from 8000 to 10,000 feet above sea level. Between the larger ranges there are broad valleys suitable for agriculture. There are over 3000 islands in the group. The largest, Luzon, is about the size of Kentucky. The second largest is Mindanao.

Review questions and map studies. 1. Near what lands are the Philippine Islands? 2. Judging from the latitude and position in the ocean, describe the climate of these islands. 3. Judging from the products, name the chief occupations of the people. 4. What is the chief seaport? On which island is it located?

5. What are the chief products exported from Manila? 6. Do the imports and exports suggest that this is a manufacturing country? Why? 7. What have you seen that came from Manila? 8. Why does the temperature remain about the same in summer and winter in these islands? 9. What foods do these islands produce? 10. Why do the natives of the Pacific Islands work less than the people of the United States? 11. Which is farther from the equator, Guam or Manila? 12. What part of the Philippine Islands is in about the same latitude as Panama? 13. What part of the Philippine Islands is in about the same latitude as the City of Mexico?

Courtesy of Bureau of Agriculture, Manila

Fig. 183. Manila hemp is made from the sheathlike layers of the trunk of the abaca tree. This man is busy pulling off the layers, one by one. When he has finished, most of the trunk will have been removed

Climate. The climate in the Philippine Islands has a greater influence upon the activities of the people than any other geographical factor.

The islands are near the equator and are surrounded by sea water. The temperature is never very low, but there is a noticeable change from day to night. The nights are commonly cool and the days are warm. During the winter, except on the windward sides of the mountains, there is little rain, but from June to September there is a rainy season throughout the islands. Under such weakening climatic conditions people do not become industrious. White people from the temperate zone, who have lived most active lives, soon stop working hard if they live in such a tropical land. There is an abundance of fruit for food, and one needs but little clothing and shelter. There is therefore no necessity for hard work.

Native people. There are over 8,000,000 people living on the Philippine Islands. Among the native people there are many groups, each with a distinct language. Most of them are peaceful and industrious (Figs. 180, 183, 185, 186), but in the mountains away from the seacoast there are yet many wild and some savage tribes (Fig. 181).

Occupations. Gold, copper, and silver have been found in the mountains, and mining has been undertaken. Along the coast there are fisheries, and farther inland there is some cattle-raising. Lumbering is important in Mindanao.

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Fig. 184. The mountain rice fields are cut out of the steep slopes, like great steps one above another. Each field is protected by a high stone wall, which keeps the soil from sliding down the mountain. The water is brought to the fields by a system of irrigation ditches

The lowland plains have rich soils, for the streams have brought fine material from the mountain slopes and spread it out on the lower lands. Sugar, cotton, rice, tobacco, and many kinds of fruit are raised, for the most part on these lowland areas. In many places irrigation is practiced, so that crops are not entirely destroyed during the dry season. The lower slopes of the mountains are also used for agriculture (Fig. 184).

Rice culture. The cultivation of rice has several very interesting stages. The fields have dikes about them, so they may be flooded. When the rains begin to fall, these dikes keep the water from running off, so the dry, hard earth becomes a mud. In certain fields men are at work plowing and harrowing the wet, muddy ground. In this work the water buffalo, one of the few animals that will work well in mud, is very helpful. After the plowing and harrowing, the seeds are scattered broadcast.

In about three weeks, or at the beginning of June, the seedlings are nearly a foot high and are ready to be transplanted. Everyone who is old enough to work in the field must help, for the transplanting must be done quickly. Most of the men and boys continue the plowing of new fields, but a few help the women and girls in the transplanting. The experienced men pull the seedlings, and the women and older children transplant them. Later the waters are drained off the fields, and the grain begins to ripen.

By the first of November the harvesting of the earliest crop begins. This is a period of great merriment, the happiest time of the year. At three o'clock in the morning on harvest days lights are seen in every house. Long before daybreak groups of men, women, and children start walking over the dikes to the harvest fields. Each one carries a flat-bottomed basket, large or small according to the size of the worker. They work on shares; sometimes it is a fifth of all that the worker has cut, sometimes a fourth or a third. Each one makes a separate heap of grain, and at the end of the day the owner of the field gives him his share. Then the workers tie up their bundles of grain and start for home, singing and laughing after the long day in the field.

Fig. 185. This man is stripping abaca sheaths by pulling them under a sharp knife. After this the strips will be dried in the sun

Manila hemp is the best-known product of the Philippines. The rich volcanic soils of the lower mountain slopes, with the abundant rainfall, give just the right conditions for the growth of the abaca tree, from which the fiber comes (Figs. 183, 185). The Filipinos take excellent care of their abaca trees. Each year they cut only those which are full-grown. The long, white fibers are bound in bundles and shipped in large quantities from Manila to Europe and the United States, where they are made into strong rope and twine. Some rope is manufactured in the Philippines.

Courtesy of Bureau of Science, Manila

Fig. 186. This Filipino family is threshing and winnowing rice. The men separate the grain from the stalks by pounding them on a stone. The women winnow the rice by tossing the grain into the air. As it falls the wind blows the chaff away

Foreign trade. Manila is the chief seaport and the seat of government (Fig. 189). The population of the city is over 200,000. Large quantities of raw hemp, sugar, and tobacco are shipped from Manila to the United States. Copra, the dried meat of the coconut, from which coconut oil is extracted, is also exported in large quantities.

Government. Since 1898, when we paid Spain twenty million dollars to give up all claim to these islands, the government has been under the direction of the United States. The native people, however, have been given practically complete control of local affairs. They have a legislature of their own and send two commissioners to our national Congress. We are helping in every possible way to educate the people and to train them to establish and maintain a good government.

Home work. Find out about how long it takes to go from San Francisco to Manila.

GUAM

The island of Guam is only thirty-two miles long and from four to ten miles wide. It was ceded to the United States by Spain in 1898, after the close of the Spanish War. It is now used as a naval station, and the island is under the control of the Navy Department of the United States.

Courtesy of Bureau of Science, Manila

Fig. 187. After it has been threshed and winnowed, the girls pound the rice in a hollowed-out log of hard wood. This pounding husks the rice grains

Guam has a wireless telegraph plant and cable connections with all parts of the world. The native people raise rice, maize, sweet potatoes, coffee, cocoa, and sugar.

SAMOA ISLANDS

For years Great Britain, Germany, and the United States have been interested in the Samoa Islands and have made various treaties regarding their rights in the islands. At present the island of Tutuila and a number of smaller islands close by are among our possessions.

These islands owe their importance to the fact that they lie on the direct steamship route from San Francisco to Sydney. They serve as naval bases and as coaling stations for vessels.

The native people in the islands held by the United States have control of most local affairs, but the president of the United States appoints a governor, who holds the highest office.

The Samoa Islands are volcanic. Some of the volcanoes are no longer active, but many of them erupt from time to time, and earthquakes are common. For the most part the islands are thickly wooded and the soils are fertile.

These islands are so near the equator that the climate is always warm, and they are in the midst of the Pacific Ocean, where the temperature is about the same in summer as in winter. At times they suffer from severe hurricanes.

Fig. 188. These carts, drawn by carabaos, are carrying the rice harvest to market in Luzon. The roads here are good and are lined with coconut palms. Rice is the largest single crop in the Philippines, but the people do not raise all they need. From what country do they import it?

The native people gather the coconuts that grow in abundance on the islands and dry the coconut meat to make copra. On most of the islands the natives pay their taxes in copra, which is the only product that is sufficiently abundant to export. In addition they raise for their own use breadfruit, yams, and a great many tropical fruits, such as pineapples, oranges, and bananas.

Fig. 189. Manila is located at the mouth of the Pasig River on the island of Luzon. This view shows the river, which is deep enough for the smaller steamers and lighters. The larger ships must either anchor in the open water or come to docks in the new harbor formed by the breakwater beyond the city

Map Plate, Patented July 5, 1921 • Method of Making Maps, Patented July 5, 1921

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THE NATION AS A WHOLE

After studying the different parts of the United States and its possessions, we should consider the nation as a whole and see how important a part the geographic conditions have played in the settlement of the country and in the development of industrial and commercial life.

Early settlements. The first permanent settlements in the United States were on the Atlantic coast (Fig. 190). In the days before there were any railroads the Appalachian Mountains held the people near the Atlantic seaboard. The mountains were a barrier that made travel to the westward difficult. Moreover, going beyond the mountains to live meant cutting off all easy communication with the settled portion of this country and also with England. Until manufacturing plants were established in America the colonists depended upon the trade with England for many of the things they needed. Perhaps the presence of Indians west of the mountains influenced some people to stay in the East. However, the fact that they did stay together led to the development of great strength in the colonies which united to make this nation.

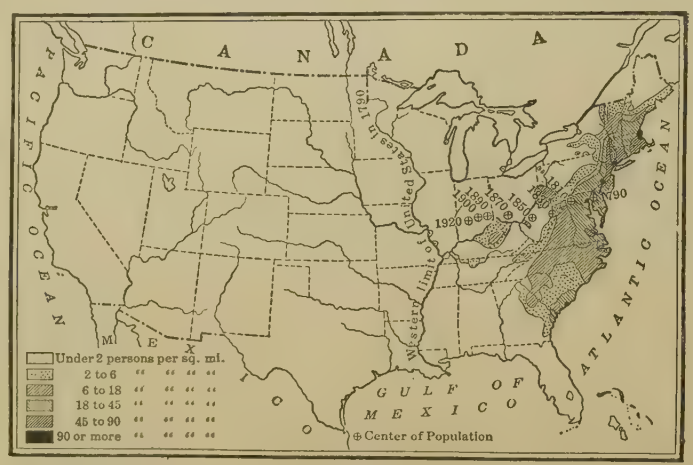

Fig. 190. This map shows the distribution of population in the United States in 1790, and the westward movement of the center of population since that time. Near what cities was the population densest in 1790? Trace the progress of the center westward. Near what city was the center in 1870? in 1920?

MAP STUDIES — POLITICAL MAP OF THE UNITED STATES

See map between pages 95 and 98. 1. What states border the Atlantic Ocean? 2. What states border the Gulf of Mexico? 3. What states that do not border the Atlantic Ocean or the Gulf of Mexico include a part of the Coastal Plain? 4. What state is north of Long Island?

5. Of what state is Long Island a part? 6. What two states are separated by Delaware Bay? 7. Into what two states does Chesapeake Bay enter? 8. Between what two states is the Savannah River?

9. Locate Mobile Bay. 10. In what state is the delta of the Mississippi River? 11. What state is separated from Mexico by the Rio Grande? 12. What states border on Lake Erie? on Lake Michigan? on Lake Superior?

13. The banks of a river are named "right" and "left" as one would see them looking downstream. Name the states on the west, or right, bank of the Mississippi River. Name those on the left bank.

14. You have named the row of states on the right bank of the Mississippi. Next to them on the west is a row whose eastern parts are in the Central Plains and whose western parts are in the Great Plains. Name these, beginning at the north.

15. What states include a part of the Rocky Mountains? 16. What states include a portion of the great plateau between the Rocky Mountains and the Cascade and Sierra Nevada Mountains? 17. At what place in the United States do four states come together?

18. What states are crossed by the Colorado River? 19. In what state is Great Salt Lake? 20. To what state should you go to see the Grand Canyon of the Colorado? 21. What mountain ranges border the great plateaus on the west? 22. What states border upon Mexico?

23. Between what two states does the lower part of the Columbia River flow? 24. What large tributary does this river receive from the southeast? 25. Bound the state in which you live. 26. Bound the United States. 27. What states border on the Pacific Ocean? 28. What states border on Canada? 29. Are the railroads more numerous in the eastern or in the western half of the United States? Why?

30. Lay out a route of travel from Boston to Los Angeles by way of New York, Albany, Buffalo, Detroit, Chicago, St. Paul, Glacier National Park, Seattle, Portland, San Francisco. What railroads should you use? What states should you cross?

31. Return from Los Angeles to Chicago by a route that will take you by a side trip to the rim of the Grand Canyon and through Denver. What is the name of the railroad used and the names of the states crossed? 32. Make a list of the chief seaports; the chief lake ports. Put the population opposite each city name. *See Appendix.* 33. What are the ten largest cities in the United States? Arrange them in the order of population.

34. What is the difference in the standard time of New York and Chicago? of New York and San Francisco? of Washington, D.C., and Denver, Colorado? 35. What large cities in New England are in about the same latitude as Rome, Italy? 36. What part of our country is in about the same latitude as Palestine, where Jerusalem is located?

37. What large cities in the United States are in about the same longitude as Bogotá, the capital of Colombia? 38. Which is farther west from Greenwich, — the capital of Texas or the capital of Mexico? 39. Compare the latitude of San Francisco with that of Peking and also with that of Tokyo.

Home work. 1. On an outline map of the United States, print in from memory the names of the states. If necessary, correct your map and try it again. Learn to do this perfectly. 2. On the same outline map, locate and print in from memory the names of five important seaports, five large lake ports, and five large river cities. 3. How many state capitals can you name and locate correctly from memory? Test yourself on an outline map.

Westward expansion. The westward expansion was largely controlled by geography. The trails used by the pioneers followed the easier routes of travel. *See map on pages 2 and 3.* On the north the Great Lakes and on the south the Gulf of Mexico formed natural boundaries.

Later, by a series of purchases and treaties (Fig. 191), the wide strip of land stretching from the Atlantic to the Pacific was acquired by the United States. In time Alaska, the Panama Canal Zone, and various islands in the Pacific and Atlantic oceans came into our possession.

Fig. 191. This map shows the steps by which the United States has expanded from the territory of the original thirteen states to its present size. How many of our present states are included in the original territory? List the different additions in order of the dates of their annexation

As pioneers pushed into all parts of the territory acquired by the United States, trails were built and small settlements were established. During the period of active railroad construction, which fortunately came when this country was being opened up, these settlements were joined together by a great network of roads. To-day it is relatively easy to reach almost any part of the United States.

Discovery of natural resources. With the expansion, the increase in settlements, and the construction of railroads, more and more of the natural resources of this vast country have been discovered and utilized.

We are fortunate in having rich soils, broad, level lands, and abundant rainfall, so that sufficient food may easily be raised. In this country we have only begun to test our ability to produce food. We have never had a great famine, and it is hard for us to believe that in some parts of the world millions of people have died in a single year for want of food.

Next in importance comes the great group of resources which furnish man with power, such as coal, oil, gas, and streams. These sources of power have increased the amount of work man can do and have led to the remarkable development in manufacturing which has taken place in the United States.

Then come the mineral resources, such as iron, copper, gold, silver, lead, and zinc.

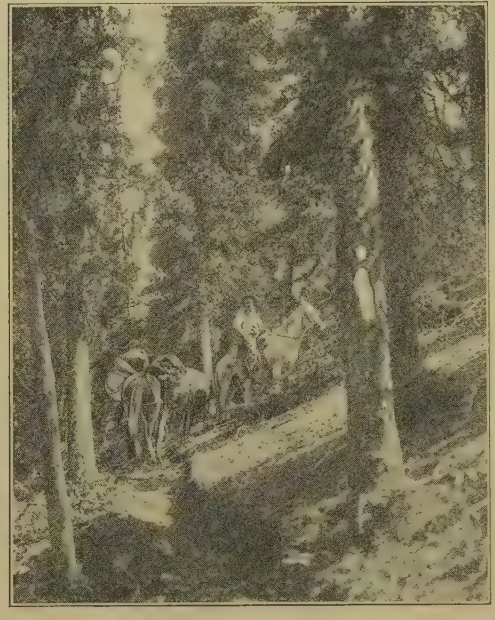

Fig. 192. This view shows the special cut, or blaze, on the trees, by which the national forest trails are marked. In what ways are the national forests a benefit to our country?

The forests are always of importance; the fish, the waterways, and the harbors have all been important in the growth of the nation.

Conservation of natural resources. Almost everyone in the United States is interested in developing or using great natural resources. It has taken millions of years for the deposits of coal, iron, gold, silver, and other minerals to form, and perhaps as long for the accumulation of natural oil and gas. It has taken a long, long time for the formation of the soils. Many of these resources can be used but once and can never be replaced.

Agriculture is dependent upon the fertility of the soils and upon rain or other water supply. Raw materials are essential to our industrial and commercial development as a nation. In this country we have come to know that from this time on the mineral wealth must not be wasted, the forests must be protected, the fertility of the soils maintained, the water-power developed, and many of the dry lands irrigated. Fish and game should be allowed to increase in numbers. The spreading of injurious animals and insects should be prevented, while other animals, and especially the birds, should be protected. The birds not only destroy large numbers of insects but add much to the pleasure of the people.

These facts are sufficient to convince one that the natural resources must be conserved if this country is to continue for all time to be an attractive place for people to live in.

Our government is making a great effort to conserve all valuable resources. The Reclamation Service is adding large areas to our agricultural lands by irrigating the dry places and by draining the wet parts; the Forest Service is engaged in maintaining the national forests (Fig. 192); the Bureau of Mines is teaching men how to extract the rich mineral ores from the earth most economically; and the Department of Agriculture is helping the farmer to raise larger and better crops.

Education. The American colonists had high ideals of education and very early established schools and colleges. A school was opened for each new settlement in this country, and as prosperity came these schools were improved. Thousands of high schools have been established. An effort has been made to give each American child and all those who have chosen to come to this country from foreign lands a good education.

Most of the states now have a number of normal schools and a university, and many of the states have established agricultural colleges, either associated with the universities or as independent institutions. There are also numerous special schools of medicine, dentistry, pharmacy, mining, and engineering, so that everyone who wishes may find a place to go for higher training in the profession of his choice.

Fig. 193. Here is a great ocean liner lying at anchor off the coast of Japan. This is one of the large ships which run across the Pacific Ocean, carrying freight and passengers between the western ports of the United States and Canada and the eastern ports of Asia. What are some of the goods carried on its westward trips? on its eastward trips?

Geographic factors which affect the growth of the nation. When a land is divided by mountain ranges into small natural regions, many distinct nations are apt to be developed. Here large natural regions and broad, level stretches of fertile lands have led to the development of a unified nation. The great railroad systems have helped to bind the people together. The breadth of view and the daring of the American people are in some degree due to the extent of its territory, its broad, open expanse of prairie lands, and its wonderful natural resources.

The location of the United States on the shores of the Atlantic is of great importance to the country. It makes possible a close association with other progressive nations of the world. On the north the Great Lakes provide easy routes for transportation, and a number of large industrial and commercial lake ports have developed.

On the south direct access to lands in the tropics is afforded by the Gulf of Mexico, which, with the Caribbean Sea, forms an American Mediterranean. Its waters touch Central America, Mexico, the United States, and the West Indies, and reach the northern shores of South America. The United States now holds a prominent place in the commerce which crosses the American Mediterranean, and in the future it will undoubtedly occupy a still more important position.

The Pacific coast gives us access to the oriental countries, and leads us to take a great and very direct interest in the development of Asiatic nations (Fig. 193). The addition of Alaska has given us land which is rich in mineral wealth and fish. It has a supply of coal which will become of importance to commerce on the Pacific. The islands of Hawaii, Samoa, Guam, and the Philippines are all important stations in the midst of the Pacific Ocean. They form a chain joined by cables and by the routes of travel followed by the great steamships crossing the Pacific. The Panama Canal is of immeasurable commercial value, and our islands in the West Indies give us additional land in the tropics where certain food supplies may be produced.

The temperature in the United States varies from summer to winter and in general stimulates thought and develops energetic people. The seasonal changes make life more interesting and force people to look ahead and provide for the future. The weather conditions are not so severe that progress is impossible, and yet they are not so mild that everyone becomes lazy. The climate of the United States has therefore been a factor of fundamental importance in the development of a strong, progressive nation.

All of these large geographic facts have been of importance in the development of the nation and have led not only to great internal strength and great wealth but to an ever-increasing interest in the other nations of the world.

Problems and review questions. 1. Where were the first permanent settlements in this country? 2. Why did the Appalachian Mountains serve as a barrier to migrations westward? 3. Describe the routes most commonly used in crossing the Appalachian Mountains. *See map on pages 2 and 3.*

4. How did rivers affect the movements of pioneers? 5. How have railroads helped in the settlement and industrial life of this

country? 6. What natural resource is of the greatest importance to the United States? 7. Name the natural resources that furnish power. 8. What metal is most useful to man? Explain.

9. How may the fertility of soils be maintained? 10. Why should water power be used? 11. How far do you know electrical power to be transmitted? 12. How may we conserve fuel resources? metals? forests? 13. What institutions for higher education are maintained in your state?

14. How have the Atlantic, Gulf, and Pacific coasts proved beneficial to the nation? 15. Where may we expect our commerce to increase greatly in the next fifty years? 16. Why should a variable climate with large seasonal change be favorable to a progressive civilization?

Government. The thirteen original colonies became the first states in the Union. For some time the newly acquired territories were large but thinly settled. As the number of people increased, the new territories acquired were divided and local governments were established. Each division was in time admitted into the Union, until there are now forty-eight states.

The national Congress is composed of a Senate and a House of Representatives. Each of the forty-eight states elects two senators, but the number of representatives elected by each state varies with the population. At present there are four hundred and thirty-five members in the House of Representatives in Congress. The people in the territorial possessions send delegates to Congress.

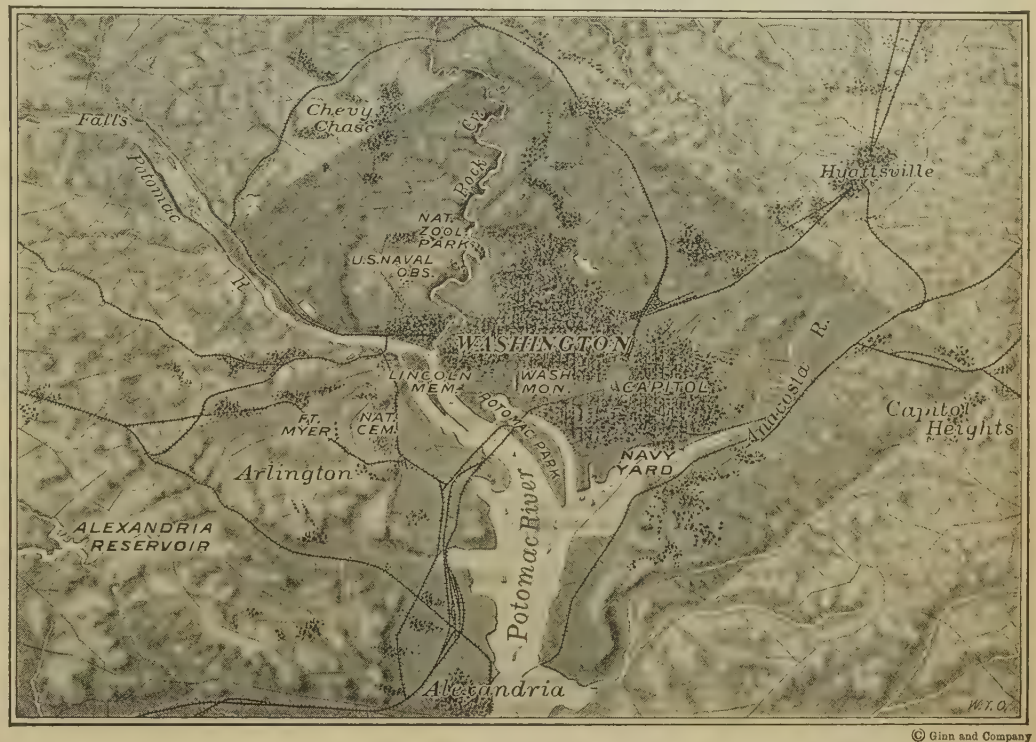

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Fig. 194. This is an aëroplane drawing of Washington. The extent of the District of Columbia, which corresponds with the city limits, is shown by the darker shading. To what states does the adjoining land belong? George Washington selected this site for the national capital in 1790 and made the first plans for the city. Describe the capital and its surroundings from what you can see in this view

The President is elected by the citizens of the United States to serve for a term of four years. He appoints, subject to the approval of the Senate, the members of his Cabinet, who take charge of the great departments of public affairs. At present the members of the Cabinet include secretaries of State, the Treasury, War, the Navy, the Interior, Agriculture, Commerce, and Labor, an Attorney-General, and a Postmaster-General.

Washington and the District of Columbia. The seat of government for the nation is the city of **Washington,** situated on the banks of the Potomac River (Fig. 194). Washington has become a most attractive city, of which every citizen of the United States may well be proud. It was established as a seat of government and is not an industrial center. The chief business in Washington pertains to the conduct of national affairs. The Capitol (Fig. 195) and the Congressional Library are magnificent structures. Large buildings have also been constructed as headquarters for most of the departments.

Each foreign nation has a representative or a group of representatives in Washington, and it is an everyday experience to those living in the capital to meet people from various parts of the world. The larger foreign nations have buildings of their own in the city.

Recently a large building has been constructed in Washington for the Pan American Union. The efforts of all those associated with this organization are directed toward bringing about a closer and better relationship between the countries of North and South America.

The National Museum is a place of great historic and scientific interest. The Red Cross organization has a beautiful home in Washington (Fig. 196), and the headquarters of the National Geographic Society are here.

Internal development. When the thirteen colonies came together to form a nation, they had a total population of about 1,000,000 people. To-day there are about 100,000,000 people in the United States. We have had a period of most prosperous internal development. The growth of cities, the construction of railroads, and the establishment of all kinds of educational institutions have been remarkable. The nation has grown strong and powerful. This was most wonderfully demonstrated in our participation in the great World War.

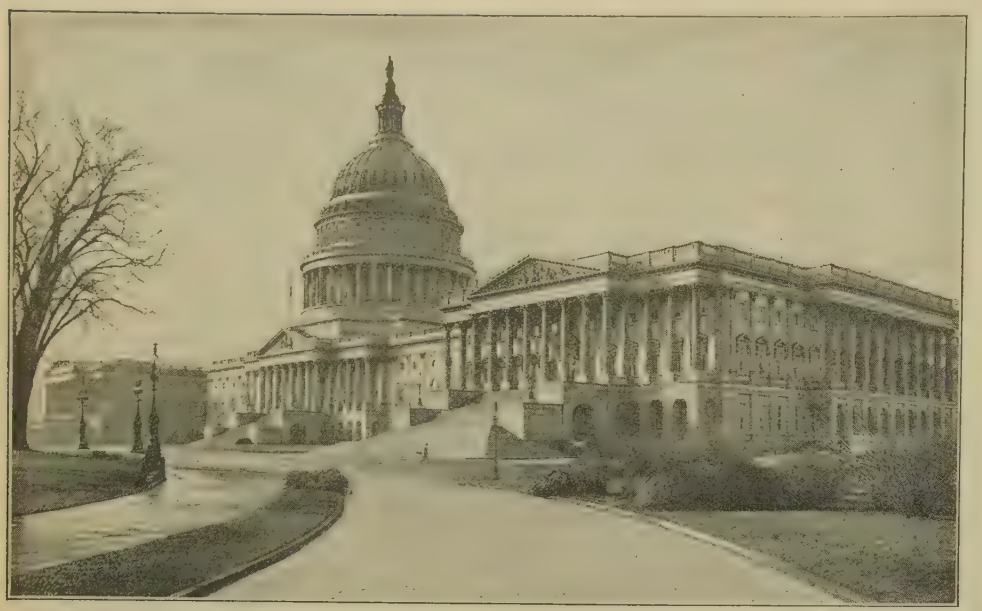

Fig. 195. The National Capitol at Washington is a very beautiful building made of white stone and marble. The dome is surmounted by a statue of Liberty, representing the great ideal of the American nation. In one of the wings is the chamber where the United States Senate meets, and in the other is the Hall of Representatives. The Supreme Court has its room in the main building of the Capitol

Maritime expansion. To-day we are moving rapidly to a more and more important position in the commerce of the world. Our great factories need raw materials from distant lands. They also need additional markets where their ever-increasing number of products may be sold. Other nations wish to carry on an exchange of commodities with us. The United States, with the hundreds of new vessels built during the World War and the many which will be built each year in the American shipyards, will certainly develop a large international commerce.

The United States in world affairs. Each time that we acquired a possession in the Atlantic or Pacific Ocean we assumed the responsibility of governing or assisting in the government of other people. This responsibility has led our government officials to make a careful study of the people living in the Hawaiian, Samoan, and Philippine Islands. We have also the problem of understanding the people in the West Indies and the native people of Alaska. In each of these countries the geographic conditions that affect the lives of the people are different from those in the United States proper.

As the great industries of the United States have developed, the manufacturers have needed more men and more raw materials. Millions of people have come from foreign lands to live in this country, and vast supplies of materials are being imported. These factors have increased our interest in the other countries of the world.

With our growth in international commerce and the part which we found it necessary to take in the great World War our interest in world affairs has increased. It has become, therefore, more and more important that each citizen of the United States should know the geography of foreign countries.

More men must be sent from the United States to foreign lands to represent our business houses. We must have diplomatic and consular representatives in all parts of the world, and the number in this service must be increased. We are interested not only in the welfare of the people within the United States and our various possessions; we are interested in the welfare of all peoples and must continue to do our part to preserve peace in the world. Individuals cannot live happily or lead the most useful lives in a community unless order is maintained there, and the different nations cannot continue their growth, and civilization cannot advance, unless peace and order are maintained in the world.

Problems and review questions. 1. Who is the highest public official in your home town or city? How was he elected? For how long? 2. How is your state represented in Congress? Who are the senators? Who is the representative from your district? 3. Who are the members of the Cabinet? 4. Where is the District of Columbia? 5. How does Washington differ from all other large cities in America? 6. What places should you like to visit in Washington?

7. About how much larger is the population of the United States now than it was at the time of the Revolutionary War? 8. Why should we be interested now in developing foreign commerce? 9. Why should we be interested now in helping to maintain peace not only at home but throughout the world?

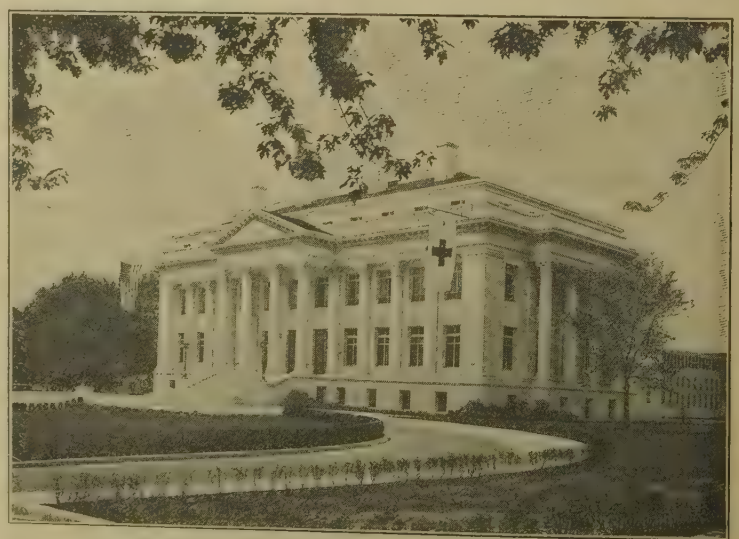

Fig. 196. This building is the headquarters of the American Red Cross in Washington. The Red Cross is an organization to which every boy and girl in the United States should belong, for its chief object is to relieve the suffering that follows great disasters in all parts of the world

Fig. 197. St. John, the chief city of New Brunswick, has a deep, sheltered harbor on the Bay of Fundy. The tides in the bay are very swift and strong, and at St. John the tide rise is twenty-five feet. This view shows part of the harbor at a time when the tide is high

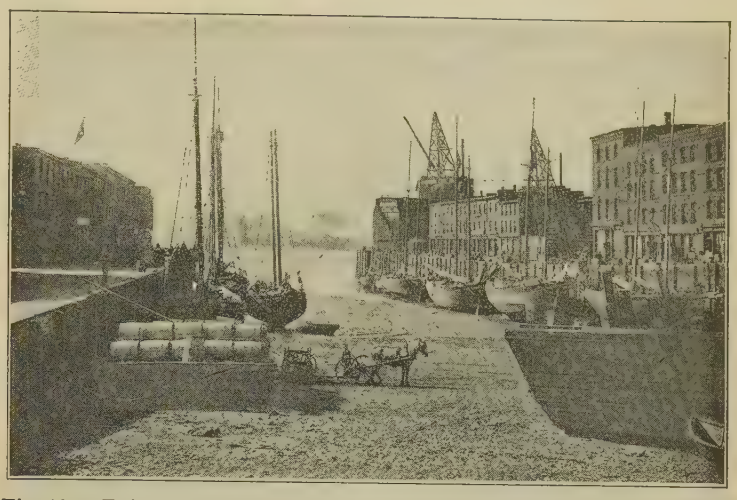

Fig. 198. This is the same spot when the tide is out, and the boats that were afloat are now aground on the reddish-brown mud flat. Why is the harbor of St. John never icebound in winter? Why is it foggy in summer? Explain the great rise of the tide here

CANADA

Our neighbor on the north, with land which extends from the Atlantic Ocean to the Pacific Ocean and northward into the Arctic Ocean, is the Dominion of Canada. It is part of the British Empire.

Most of the people in Canada are of British descent. A large proportion of them live along the southern border, near the United States.

The political divisions of Canada correspond to our states, but they are called provinces. The three farthest east are the Maritime Provinces.

Climate. *Use map on page 124.* Most of Canada has sufficient rainfall for agriculture. The moisture-bearing winds from the Pacific Ocean give up rain on the mountains. There, on the coast ranges and Rocky Mountains, dense forests flourish and glaciers are formed.

On the Great Plains east of the Rocky Mountains, and in the Far North, there is little rainfall. In those parts there are great extremes in temperature, but the dry air and bright sunshine are bracing and healthful. The whole interior of Canada has what is known as a continental climate, which means that there is a great change in temperature from summer to winter and only moderate rainfall.

The air becomes cold as it travels far to the north, and it gives up most of its moisture before it reaches the tundra area on the northern margin of the continent. In that part of Canada the winters are so long and so severe that very few people live there. *See map opposite page 124.*

In the valleys of the St. Lawrence and Ottawa rivers cold winters are followed by warm and delightful summers. In the Maritime Provinces, which are nearly surrounded by water, there is much less change in temperature from season to season than there is farther inland. The climate of these provinces is therefore much like that of New England.

APPALACHIAN HIGHLANDS

Beginning at the east (*see map, p. 122*), the first natural region is part of the Appalachian Highlands. It includes most of the land to the southeast of the St. Lawrence River, as well as the islands in the Gulf of St. Lawrence. The mountains in this part are old and worn down. They are rounded, smoothed, and forested. The rest of the land is either plateau-like or forms a part of the Coastal Hilly Belt which we studied in connection with the New England region.

New Brunswick has a sunken coast with good harbors, and those on the Bay of Fundy are always free from ice (Figs. 197, 198). Fishing is the chief occupation of the people. This province is partly covered with spruce forests, and that has led to the grinding of wood into pulp, which is also an important industry. Dairy-farming and agriculture are spreading throughout the area where the forests have been cleared away.

Prince Edward Island is a hilly land with an irregular coast. The chief occupations of the people are fishing, fruit-growing, and dairy-farming. Cheese and butter are made for export, and the skimmed milk is given to pigs.

Nova Scotia. The irregular peninsula southeast of the Bay of Fundy, together with Cape Breton Island, form the province of Nova Scotia. There are many excellent harbors along the coast, because the shore line is sunken (Fig. 199). **Halifax** has the best harbor on the mainland, and **Sydney** the best harbor on Cape Breton Island.

Bordering the Bay of Fundy are rich orchard lands and many excellent farms. Apples are grown and exported

in large quantities. Lumbering is carried on, and the wood-pulp industry has been established; and where the forests have been cleared away, farming has been begun.

Fig. 199. This is the harbor of Yarmouth, one of the most prosperous towns of Nova Scotia. It is situated on a small bay at the southwestern end of the peninsula and is the chief shipbuilding center of the province. The lake country back of Yarmouth is much visited by tourists

Nova Scotia is fortunate in having a large supply of coal. It produces each year about half of all the coal mined in Canada. Iron is secured from Newfoundland, and these two natural resources give promise of a great commercial and industrial future for Nova Scotia. There are foundries at **Sydney**, where the Newfoundland iron ore is used in the manufacture of steel rails.

Home work. 1. On an outline map of Canada locate and name the chief seaports, the capital of the Dominion, and three important inland cities. 2. Classify your pictures of Canada by natural regions. 3. Read about Amundsen's and Stefansson's travels among the islands of the Arctic Archipelago. 4. Read and report on the government of Canada. 5. Read and report on the tides in the Bay of Fundy. 6. Read about the building of the Canadian Pacific Railway.

LAURENTIAN UPLAND

Northwest of the St. Lawrence River, north of the Great Lakes, and extending far into the Arctic Ocean is the Laurentian Upland. *See map on page 122.* This vast area varies in elevation up to about 2000 feet above the sea. At the extreme northern end of Labrador, in the region east of Ungava Bay, mountains have been reported which rise to a height of 6000 feet above sea level. The far northern part of this natural region is but little known.

The Laurentian Upland is a very old land. Indeed, it is probably as old as any land in North America or any other continent. The rocks have been exposed to the weather, broken up, and formed into soils. Rivers have worn down the lands, and the great continental glaciers that formed in this region have assisted in the work (Fig. 14). The Laurentian Upland extends into the provinces of Quebec, Ontario, Manitoba, Saskatchewan, and Alberta, and into the Provisional Districts of Keewatin, Mackenzie, and Franklin.

Throughout the region there are numerous lakes, swamps, marshes, and ponds. Rivers usually connect the small bodies of water, and thus canoe journeys may be planned through most of this country; in fact, that is the usual method of travel in the country beyond the railroad lines.

The province of Quebec has the advantage of a shore line on each side of the St. Lawrence and on Hudson Bay. The best soils are in the St. Lawrence Lowlands and on the narrow terraces, or benches, which border the St. Lawrence River. Most of the settlements are therefore located near the river. The farms are principally on the south bank. Each farm has a little frontage on the river and extends back for some distance to the higher land.

In the region of the lower St. Lawrence the majority of the people are of French descent and speak the French language. In their homes, schools, churches, and town organizations they live much as their forefathers did who came to this coast from France hundreds of years ago.

Nearly all the streams draining from the uplands toward the St. Lawrence have falls in their courses. In this region there is a fall line such as we found along the east margin of the Piedmont Belt in the United States. The water-power along that line should lead to the growth of manufacturing towns.

On the south side of the St. Lawrence there are remarkable deposits of asbestos, which provide nearly all the world's supply. This material is found in great cracks in the rocks. It is sometimes called mineral wool.

Fig. 200. Quebec is located on a bold headland overlooking the broad St. Lawrence River. The Upper Town is partly walled and has an ancient citadel. This view shows Dufferin Terrace and the Lower Town. Locate Quebec on your map. It has been called the "Guardian of the Gateway to Canada." Can you tell why?

The city of Quebec is a wonderfully attractive place with special historic interests. The city is built in part on the heights above the St. Lawrence and in part on the lowland bordering the river (Fig. 200). The city

was founded as a fur-trading post, and the site was chosen because it was an easy place to defend. The estuary of the St. Lawrence ends at the city, but the tide runs for 90 miles farther upstream. Formerly Quebec was the chief seaport of Canada, but the deepening of the river has allowed ocean-going vessels to continue upstream to Montreal.

Fig. 201. Montreal occupies part of a low island at the junction of the Ottawa and St. Lawrence rivers. The Ottawa River opens up the forested district to the north and west, and the lumbering there has led to the building of pulp mills at Montreal. What are the other industries of Montreal?

Home work. Find out all the uses you can for asbestos.

Montreal has a wonderful situation. It is a thousand miles from the Atlantic and is on a great navigable river which is the outlet of the Great Lakes. But for one handicap it might rival the greatest Atlantic ports. That handicap is ice, for from the middle of December to near the end of April the river is frozen. The Ottawa River encircles the city, and logs are drifted down that river from the forested areas to the northwest.

Montreal is now the metropolis of Canada, an important railway center, and the terminus of many steamship lines (Fig. 201). Large harvests of wheat come to Montreal from the West, in part by way of the Great Lakes and in part by rail. Lumber and wood pulp are made of the logs that are sent down the Ottawa River. The grain coming into the city has led to the establishment of flour mills and breweries. The route to the south through Lake Champlain and the Hudson valley to New York City is only 420 miles long. Large trans-Atlantic vessels bring European goods directly to Montreal and take away the raw materials which Canada sends to the Old World.

These geographic advantages explain why Montreal has come to have a population of half a million people, — a large number when we remember that the total population of Canada is not much more than eight million.

HUDSON BAY LOWLAND

At the southern end of Hudson Bay there is a small coastal plain. *See map on page 122.* This is a land of clay soils. It is forested now, and there is an abundance of game in the forests. Some day the trees will be cleared away and this lowland region will probably become an agricultural district.

CENTRAL PLAINS

North of Lake Ontario and Lake Erie there is a small portion of the Central Plains, a natural region which we studied in connection with the United States. *See map on page 122.*

This land is sometimes called the *Lake Peninsula* because it is bordered on the south, east, and west by lake waters. It is one of the most favored parts of Canada. The soils are rich, and it was formerly a wheat-producing area. Now that wheat is grown more cheaply on the Great Plains of the West, dairy farming and the raising of swine have become important.

Oil has been discovered in the rocks underlying these plains, and this should lead to greater industrial development.

The province of Ontario includes the Canadian extension of the Central Plains, a portion of the Hudson Bay Lowland, and some of the Laurentian Upland. In the Laurentian Upland silver, iron, copper, and nickel are obtained. Near **Sudbury**, an important railway center, are some of the richest nickel mines in the world.

Fig. 202. The harbor at Port Arthur on Thunder Bay in Lake Superior is full of lake freighters, some west-bound for Duluth, and others east-bound for ports on the other Great Lakes. Port Arthur and Fort William are receiving and shipping centers for the grain from the prairies. The building of passenger vessels and grain carriers is an important industry at Port Arthur

Toronto, the second city in Canada, is situated on the north shore of Lake Ontario. It is an important railway center and a port reached by lake steamers. Electric power generated at Niagara Falls is transmitted to Toronto, where it is used in the factories.

Fig. 203. Here is a big threshing machine at work in the wheat fields of Manitoba. The stalks of grain are fed into the machine, which separates the seeds from the straw and blows out the chaff. The broad, level plains of Manitoba are covered with rich black soil and contain thousands of square miles of the best wheat-growing land in North America

Ottawa, the capital of the Dominion, is located at the Chaudière Falls of the Ottawa River, 100 miles from Montreal.

MAP STUDIES

1. What natural regions cross the line from the United States into Canada? 2. How do you explain the numerous lakes of Canada? Name and give the location of four of the larger lakes. 3. Plan out a canoe trip, starting from Lake Winnipeg and ending at the mouth of the Mackenzie River.

4. When you are far down the Mackenzie you could go up one of the tributaries on the west and get into the headwaters of the Porcupine, and if you kept on going downstream, where would you end your journey? You will need to consult the map on page 84 to finish this journey.

5. Explain the very irregular coast lines in the east, north, and west of the Dominion of Canada. 6. Locate the north magnetic pole on this map. 7. If you should carry a compass in a circle around that pole, how would its magnetic needle change?

8. Which one of the great rivers of our northwestern states rises in Canada? 9. What river rises in the United States and flows northward to Lake Winnipeg? 10. Where is the grain raised that is exported from Montreal to the United Kingdom? 11. Why should wool and woolen goods be imported? 12. Do you find that the raising of sheep is anywhere one of the chief occupations of the people? Explain. 13. Why is northern Canada a favorable locality from which to obtain furs?

14. What are the chief fish caught in Canadian waters? 15. What large animals are caught in the seas near Canada? 16. What parts of Canada are best suited for farming? for cattle raising? for mining?

17. What valuable mineral resources are there in the south-central portion? in the far-western portion? 18. What is the chief western seaport? 19. With what countries is most of the commerce carried on? *See Appendix, Plate B.*

20. Why are there no great seaports on Hudson Bay? 21. What are the chief railroads that extend from eastern Canada to the Pacific coast? 22. What routes may the vessels from Vancouver to Great Britain follow?

23. Locate the famous Klondike gold fields. 24. What coast should you like to visit for pleasure? 25. The Dominion of Canada is a part of what great empire? 26. Is the densely settled portion of Canada as far north as London?

27. Is any part of Canada as far south as Rome, Italy? 28. What important Canadian seaport is in about the same longitude as the Bermuda Islands? 29. Which is farther west from Greenwich, — Ottawa or the Panama Canal? How much farther west? 30. What seaport in California is in about the same longitude as the capital of British Columbia?

GREAT PLAINS

The region that we studied in our own country as the Great Plains extends northward into Canada between the Laurentian Upland and the Rocky Mountains, and reaches to the delta of the Mackenzie River.

On the broad, open plains, where the soils are fertile, the snows melt in the spring and supply water for starting the seeds of grain. The light rains of early summer are favorable to the growing of wheat, and the drier season which follows allows the wheat to ripen and gives perfect conditions for harvesting. In this latitude the summer days are long and the nights are short. The abundance of sunshine favors the growth of wheat (Fig. 203).

Just as we learned in the study of the plains of the United States, the plains of Canada are farming lands in the east and grazing lands in the west (Fig. 204). The change from farming to grazing is due to the decrease in rainfall as we approach the mountains. Settlements are rapidly pushing northward. Oil has been discovered recently near the foothills of the Rocky Mountains in the province of Alberta.

Fig. 204. The Great Plains are covered with luxuriant grass which makes perfect pasturage for cattle. This is one of the valuable herds of the region. What are the chief crops in the cultivated parts of the region? Why is there more grazing in the west and more agriculture in the east?

The southern portion, about Lake Winnipeg, is an excellent farming district. This is the northward continuation of the great wheat-growing region in the valley of the Red River,

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Fig. 205. This is the railroad bridge over the North Saskatchewan River at Edmonton, the capital of Alberta. Two transcontinental railroads pass through Edmonton, making it a very important commercial center. Beyond the bridge you can see the city and the Provincial Parliament buildings. The trappers from the north bring their furs to Edmonton for sale and exchange for supplies

which we studied in connection with North Dakota and Minnesota. It has a deep, rich soil containing hardly a stone.

Manitoba includes a part of the Hudson Bay Lowland, some of the Laurentian Upland, and in the south a part of the Great Plains.

Winnipeg is the third largest city in Canada. In the early days it was a small fur-trading post, but the location was favorable to the growth of a large city. It is only 400 miles from Lake Superior, in the midst of a prosperous farming country and halfway between Montreal and Vancouver. To-day it is the largest grain and fur market in the British Empire. It contains one of the largest grain elevators in Canada and is coming to be a great manufacturing center.

Saskatchewan and Alberta. These provinces are for the most part within the Great Plains. They include with Manitoba the great wheat and oat-producing lands of Canada. **Regina** is the chief city in Saskatchewan, and **Edmonton** (Fig. 205) is the chief city in Alberta. The transcontinental railroads have made possible the rapid settlement and development of this part of Canada.

Provisional districts of Keewatin, Mackenzie, and Franklin. Relatively little is known of this part of the country. It is a wilderness. Exploring parties have found their way between the northern islands and passed from Baffin Bay to Bering Strait. They have found a few Eskimos living on the Far-Northern islands. Most of the people on the mainland are Indians (Fig. 206). They collect furs, hunt the caribou, and fish in the rivers and lakes. There are no towns in this part of Canada, but only small trading posts. The white people here are chiefly interested in securing furs.

Fig. 206. This is a wandering Indian family of northern Canada. They roam over the cold, treeless plains, living by fishing and by hunting caribou and musk oxen. Why do they not raise crops? Why are they constantly moving about? What is their tent made of?

Home work. 1. From the Appendix find out what are the five largest cities of Canada. 2. Locate these cities on an outline map. 3. Learn to name and locate these cities accurately from memory. 4. Find out one important thing about each of these cities.

WESTERN MOUNTAINS AND PLATEAUS

The mountain and plateau part of Canada is a region of wonderful scenic beauty, with high mountains, hundreds of glaciers, beautiful mountain lakes (Fig. 208), and deep canyons. A great part of this region is yet almost untouched by man.

British Columbia. Much of this province is heavily forested, and in the mountains mining has been undertaken. The chief city of British Columbia is **Vancouver**, which has an excellent harbor and is the western terminus of the Canadian Pacific Railroad. Vessels start northward from there along the coast for Alaska, and others leave for Japan, China, Australia, and other parts of the Pacific. *See map on page 107.*

Vancouver exports wheat from Alberta, and salmon caught in the cold streams of British Columbia. Minerals from the mines of British Columbia and lumber from the wonderful forests of giant Douglas fir are also exported (Fig. 209). Opposite this seaport, on the island of Vancouver, there are coal mines which supply western Canada. Many of the steamships which cross the Pacific secure their fuel from these mines.

The island of Vancouver has a delightful climate with but slight changes in temperature. The mountain scenery and the lakes and forests add beauty to the country. In the fertile valleys are many comfortable homes. **Victoria**, at the southern end of the island, is the capital of British Columbia and an important Canadian port.

Yukon. Those who go to the Yukon country usually follow the coast route to Skagway, Alaska, and then cross the mountains on a railway to the headwaters of the Yukon River. The Yukon country is for the most part mountainous. The famous Klondike Gold Field is located on one of the tributaries of the Yukon River near the city of **Dawson**. The climate in that part of Canada is severe, with long, cold winters and short, cool summers. Few people would ever go there if it were not for the gold which is found in the stream gravels (Fig. 207). In the mountains there are many mines, and we may expect mining to be further developed in this province.

Conservation of Natural Resources

Canada's great wealth lies in its natural resources, and the future of the country depends chiefly upon the way in which the resources are used.

Fig. 207. This man is a gold prospector. He is washing the river sands and gravels in his pan to find out whether they contain enough gold to make mining worth while

To safeguard against waste of natural resources Canada created a Commission of Conservation in 1909. This commission, like our own in the United States, is subdivided into different departments. There are departments of land, forest, mineral, fuel, game, and water-power conservation. It is the duty of the officers of each department to make a study of the natural resources for which that department is responsible.

For example, those who have charge of the conservation of minerals have not only made a business of discovering what possibilities there are in Canada of greater mineral development but have found out how the different minerals can be most economically mined. Each of the departments aims to make its services just as valuable to the nation as possible.

It often happens that the work of one department is a help to another. Thus, when the committee on minerals discovered rich deposits of phosphate in the Rocky Mountain Parks, this discovery was of great value to the department of agriculture because it provided a source of fertilizer for the farmers.

The work done by the Commission of Conservation will be of great help in the development of Canada.

Fig. 208. These horsemen are riding along the shore of Lake Louise, one of the most beautiful sheets of water in the Canadian Rockies. The lake is more than a mile above sea level and is surrounded by high, snow-covered mountains. What part of the United States is similar to this region?

Problems and review questions. 1. Why do most of the people in Canada live near the southern margin of the country? 2. What winds bring moisture to British Columbia? 3. Why is it dry in the Great Plains region? 4. How does the Labrador Current affect the climate of the east coast?

5. What section has the greatest annual range in temperature, or difference between the hottest season and the coldest season? 6. What is the general influence of the oceans on the temperature of the lands near them?

7. How does temperature change with latitude? with altitude? 8. What are the chief products of Nova Scotia? 9. What conditions made possible the steel industry at Sydney? 10. What is the chief occupation of the people of New Brunswick?

11. What is the usual way to travel in the northern wilderness of the Laurentian Upland? 12. What use is being made of the forests of the Laurentian Upland? 13. In what part of Canada is the French language commonly spoken? 14. Why should Montreal have become a larger city than Quebec?

15. What is the capital of the Dominion of Canada? 16. Where are the prosperous farming districts of Canada? 17. Where are the chief mining districts of Canada? 18. What geographic conditions favored the growth of Winnipeg? Vancouver? Dawson?

Fig. 209. The western slopes of the mountains in British Columbia are covered with great forests, and lumbering is very important. The rainfall here is the heaviest in North America. Can you explain this fact? *See map on page 124.* Why are oxen used here for hauling the logs?

Fig. 210. St. Johns, the capital of Newfoundland, is situated on one of the finest harbors in America. The harbor is landlocked and deep, offering anchorage to the largest ships even at low tide. It can be entered only by way of a narrow channel guarded by high cliffs. Fishing is the chief industry of St. Johns. In the spring the fishing boats start for the Grand Bank, which swarms with cod and other fish during the summer months. In the late summer the fishermen return with their catch. The fish are then carefully dried and prepared for export. To what countries are they sent?

NEWFOUNDLAND AND LABRADOR

Newfoundland is about the size of Maine and New Hampshire combined. It is the northeastern terminus of the Appalachian Highlands. The western portion is mountainous, and the rest of the island is hilly, with small areas of level land in some of the valleys. The eastern coast of Newfoundland has sunk, forming a number of deep fiords, long peninsulas, and high cliffs, and producing several excellent harbors.

Most of the life in Newfoundland is near the coast. Fishing is the chief occupation. Offshore there is an area, larger than the island itself, where the sea water is less than 600 feet deep. This forms the Grand Bank, which is one of the richest fishing grounds in the world.

In the interior, where there are forests, the manufacture of paper from wood pulp has been undertaken. Coal, iron, copper, gold, and nickel have been discovered on the island, and these deposits have been worked to some extent.

The capital of Newfoundland is **St. Johns**, on the east coast of the island (Fig. 210).

Where the cold Labrador Current passes Newfoundland and meets the warm water of the Gulf Stream, fogs are formed, which often make travel in that part of the ocean very dangerous. Great icebergs from the arctic regions drift southward in the Labrador Current and are often seen by vessels passing from North America to Europe. The icebergs are frequently surrounded by dense fogs, and the captains of the vessels must use great care to avoid hitting them. Even large ocean liners have been sunk by collisions with these great masses of floating ice.

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Fig. 211. Nine tenths of the people of Labrador depend upon the fishing industry for their living. These men are spreading out the cleaned and salted codfish to dry on the wharf

Home work. 1. About how far is it from St. Johns, Newfoundland, to Liverpool? *Use Plate B in Appendix.* 2. Compare that distance with the distance from New York to Liverpool. 3. Find out what fraction of an iceberg appears above the water. 4. Make a drawing of an iceberg, in the proper proportion, showing how much is above and how much is below the surface of the water.

Labrador is separated from Newfoundland by the Strait of Belleisle, which is 12 miles wide. Politically it is a part of Newfoundland, but local affairs are left to those who live in Labrador.

Both Labrador and Newfoundland have been covered by glacier ice, so the rock hills are rounded and smoothed off, and there are many glacial moraines and bowlders on the surface. There are long, deep fiords and rocky headlands along the coast.

About 400 Eskimos make up most of the permanent population. They live chiefly by fishing (Fig. 211); and when there is a poor season, there is danger of a famine. Missionaries have introduced the reindeer as an additional source of food and clothing for the people of this bleak coast.

Problems and review questions. (1.) What is the political relationship of Labrador to Newfoundland? (2.) To what empire do they both belong? *See map on page 107.* (3.) What is the chief occupation of the people in these countries? (4.) What minerals have been found in Newfoundland? 5. Why should there commonly be a fog around an iceberg?

(6.) Why should there commonly be fogs off the coast of Newfoundland even if there are no icebergs there? 7. Explain the long, deep fiords on the coast of Newfoundland and Labrador. (8.) Why is the Grand Bank an excellent fishing ground? It is one of the three greatest fishing grounds in the world. The other two are the North Sea and the Japanese waters near Asia. 9. Why is the Grand Bank a dangerous fishing ground?

Fig. 212. This is the beautiful cathedral of the City of Mexico. It was built by order of one of the kings of Spain, and although it was started in 1667, it was not completed for more than a century. Its two great towers, 200 feet in height, rise above all the buildings of the city

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Fig. 213. The view southeastward from the cathedral towers is very beautiful. The city, with its low, solid buildings of Spanish architecture, spreads out over the flat-floored Plateau of Mexico. In the distance are the snow-capped volcanic peaks of Iztaccihuatl and Popocatepetl

MEXICO

Mexico is a Spanish-American country with over 15,000,000 inhabitants. The white people, who make up only a small part of the population, are chiefly of Spanish descent. Most of the inhabitants are native Indians or people of mixed descent, resulting from the marriage of the white people with the natives. Spanish is the official language.

This is a country of great variety. In the plateau and on the west coast it is very dry, and in the high mountains and on the east coast it is very wet; there are low plains, high plateaus, and high mountains; there are dense tropical forests, grassy plains, and sagebrush deserts. Near sea level it is always very hot, at intermediate elevations there are temperate climates, while some of the mountain tops are always snow-covered. Such geographic conditions present many opportunities for the Mexican people and many interesting problems for us.

Gulf Coastal Plain. (*Maps: between pp. 117 and 120; p. 122*). Bordering the Gulf of Mexico is a coastal plain which is an extension of the Gulf Coastal Plain that we studied in the United States. In Yucatan the plain widens and takes in most of that peninsula.

Eastern Sierra Madre. Rising abruptly from the western margin of the Gulf Coastal Plain is the Eastern Sierra Madre, a young and rugged mountain system which is a continuation southward of our Rocky Mountains. These mountains contain rich deposits of minerals. Their eastern slopes are clothed with dense tropical vegetation.

Mexican Plateau. Traveling westward, we cross the Mexican Plateau, a region of broad, flat areas and low mountain ranges. All but the southern portion of this plateau is a semidesert, containing many extremely dry places. In the north is a region of inland drainage like that in our Great Basin region of the United States, where the streams descending from the mountains sink into the sandy soil or flow into salt lakes.

Western Sierra Madre and Sonoran Desert. Moving still farther west, we come to the Western Sierra Madre, which is also a young, rugged mountain system. These mountains contain deposits of very valuable ores. On the eastern slopes, toward which the moisture-laden winds blow, they receive a heavy rainfall; but the rain clouds cannot pass over the summits, and on the western side the land is dry. The Sonoran Desert consists of a foothill belt and a narrow coastal plain bordering the Gulf of California.

Lower California is a part of Mexico. It is a rugged land made by the continuation southward of the Pacific Coast Ranges of California. Most of it is a desert.

High volcanic peaks. A range of lofty, snow-clad, volcanic peaks bounds the Plateau of Mexico on the south. The three highest peaks of this range are Orizaba, the *Star Mountain*; Popocatepetl, or *Smoking Mountain*; Iztaccihuatl, or *White Woman* (Fig. 213).

Rainfall. Most of Mexico is in the belt of the northeast trade winds. As those winds blow toward the equator they become warmer and warmer, and so tend to take up moisture. In blowing over water surfaces they may become very moist, but unless they are forced to rise

Fig. 214. These Mexican women are making the beautiful drawn work for which their country is famous. Where does their thread come from?

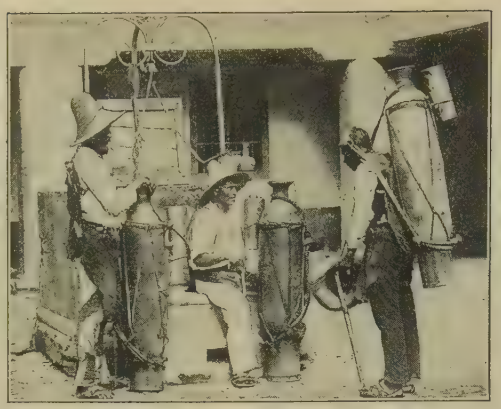

Fig. 215. These men are water peddlers in the City of Mexico. Notice the size of their water jars and the curious way in which they are carried

Fig. 216. This ship is being loaded with mahogany logs at a Mexican port. Where will these logs be sent, and what will they be used for?

or some cold object intervenes, no rain will fall. Both ranges of the Sierra Madre force these winds to rise, and so act as condensers; rain falls abundantly on their windward slopes. The streams from the western mountains are used to irrigate portions of the dry plateau region. The southern portions of Mexico receive rains in summer, when the sun appears to come northward.

Zones of altitude. Because of the great differences in elevation in Mexico, there are three distinct zones which have special Spanish names. The *tierra caliente*, or hot land, extends from sea level up to 3000 feet. The temperature in this zone varies from 75 to 80 degrees, though it sometimes rises to 100 or 105. The winters are warm, but the summers are hot. The eastern coastal plain of Mexico and a part of the adjoining mountain slope are included in this zone. It is a land of rich foliage, beautiful flowers, and many fruit trees. Along the coast are mangrove swamps, and farther inland there are coconut palms, mahogany trees, and rubber trees. In the forests there are gorgeously colored birds and butterflies, monkeys, and prowling beasts that make their homes in jungles.

The next zone, extending up to 5000 or 7000 feet, is called *tierra templada*, or temperate land. Here the thermometer will reach 60 or 70 degrees, the temperature many people enjoy in their homes during the winter. The Mexicans like to call this the land of "perpetual spring." This zone includes part of the mountain slopes and some of the great plateau. The third zone, called *tierra fria*, or cold land, is still higher. Evergreens and some deciduous trees grow here. The high mountain tops are very cold, and they rise above the timber line.

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Fig. 217. The great Juanacatlan Falls of the Santiago River are often called the "Niagara of Mexico." Hydroelectric power is developed here for manufacturing and for use at Guadalajara, twenty miles away

Within a few hours one may pass by rail from sea level, where the heat is very oppressive, up through the temperate zone and into the cold zone in the high mountains. The people of Mexico have the products of the torrid, warm-temperate, and cool-temperate zones near at hand.

Natural resources. Mexico is very rich in natural resources. The mineral wealth consists of silver, gold, copper, lead, and many other metals. Mexico is also fortunate in having a large supply of petroleum and some excellent water-power sites (Fig. 217). The fertile lands in the lowlands and on portions of the plateau furnish foods, and the forests yield ebony, mahogany (Fig. 216), and rubber. There are also extensive grazing lands.

Millions of dollars have been invested in the natural resources of Mexico by people in the United States.

Occupations. Mining produces the greatest wealth of the country (Fig. 219), but agriculture is the occupation which most of the people must follow in order to earn a living (Fig. 218). The grasslands on the plateau support millions of cattle, sheep, horses, and goats. Leather has long been one of the chief products of this country, and the Mexicans are experts at ornamenting the articles made from it.

The great mass of laboring people, who are chiefly Indians and half-breeds, are called *peons*. They work for very small wages in the mines, in the fields, and on the plains where they care for stock. They are learning to work in some of the factories.

Home work. 1. On an outline map of Mexico locate and name the chief natural regions, the capital, and two seaports. 2. Read about the life of the peons. 3. What Spanish explorers reached Mexico?

Cities. **Tampico** and **Vera Cruz** have the best of the poor harbors along the Gulf coast. The waters are shallow, with offshore bars and reefs. Commerce with the United States and Europe is carried on through these ports. *See map between pages 117 and 120.* Tampico has been helped by the development of oil wells in Mexico. Vera Cruz has been the leading port since the days of Cortez.

The **City of Mexico**, the capital of the republic, is situated at the southern end of the Mexican Plateau and is nearly surrounded by high mountains (Figs. 212, 213). **Puebla** is near the City of Mexico, and because of water-power and a supply of raw materials it has become a center for the manufacture of cotton. **Guadalajara**, **San Luis Potosi**, and **Monterey** are important inland cities, and **Mazatlan** is the chief seaport on the west coast.

In the center of a Mexican city is a plaza, or open park, about which many of the most important buildings are placed. At one side is a cathedral; opposite the cathedral may be a national or city bank and other public buildings. The chief shops and places of amusement are built on the edge of the plaza whenever this is possible, and the public markets are near by.

A city home is usually built around a *patio*, or central garden, which the family enjoys in private. Instead of having a front yard, as many homes in the cities of the United States have, the houses in Spanish cities are built out to the sidewalks and have the yard hidden from the street.

Government. The thirty-one states and territories in Mexico are united to form a federal republic, with a constitution modeled after that of the United States. The states have a degree of local self-government, and they unite in the election of a president and other national officers, as we do. The great mass of poor, ignorant, uneducated peons, however, make it difficult to conduct public affairs satisfactorily. In a free country it is important that all citizens become well educated.

Future. The remarkable wealth of natural resources may bring prosperity to Mexico. Mining should be promoted and agriculture extended by means of irrigation. Probably Mexico will never become an industrial nation, because the people show little ability in mechanical arts or invention.

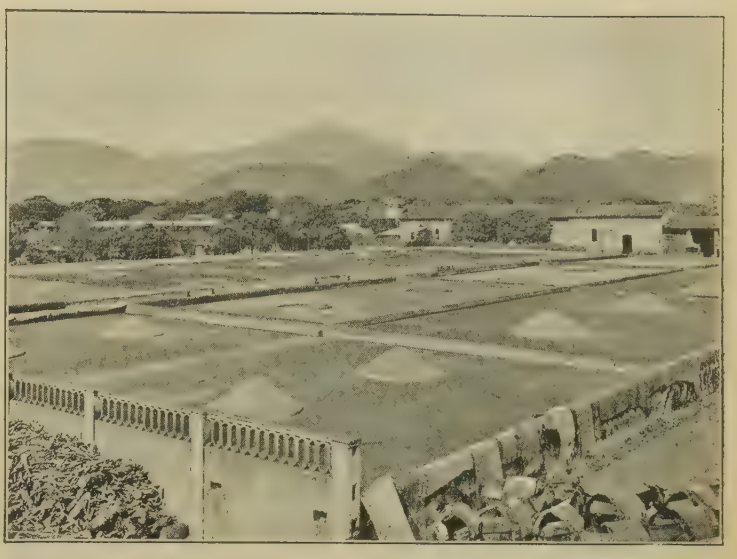

Fig. 218. Here are the coffee-drying yards on a Mexican plantation. The coffee beans are spread out to dry and are then raked up into piles ready to be put into bags for shipment. What other products do the Mexican planters and farmers grow? What products are exported?

More well-trained white people are needed to develop the natural resources, and living and working conditions for the laboring classes must be improved. Higher standards of education should be established, and arrangements should be made so that a larger number of Mexicans may own homes and ranch lands. A strong and just government must be maintained.

Problems and review questions. 1. What European nation early became interested in Mexico? 2. What is the official language of Mexico? 3. What natural regions in the United States extend southward into Mexico?

4. What are the prevailing winds of Mexico? 5. Where is the rainfall heavy? Why? 6. Why is the Mexican Plateau dry? 7. Explain the Sonoran Desert. 8. What reasons are there for thinking of the mountains as young?

9. Explain and describe the zones in altitude. 10. What are the chief natural resources of Mexico? 11. Name the capital and chief seaports. 12. Describe the plaza of a Mexican city and the patio of a Mexican home.

13. Name the mountain ranges in Mexico. 14. Locate the three highest mountain peaks. Find the elevation of these peaks in the Appendix. 15. Explain how it is possible for the people of Mexico to have both torrid-zone and temperate-zone products near at hand. 16. Account for the lack of prosperity in Mexico. 17. What remedies can you suggest for this lack of prosperity?

Fig. 219. This is a modern copper-smelting plant in Mexico. The rich copper ore is mined near by and then brought to the smelting works, where the metal is separated from the rock. The production of copper is a very important industry in Mexico and is carried on mostly by American and European companies. In what parts of Mexico is copper found? What other metals does Mexico produce?

Courtesy of the Pan American Union

Fig. 220. This is a view on a banana plantation in Costa Rica. The men have cut the bunches of bananas from the plants and are loading them upon the ponies' backs. The ponies will carry them to the freight cars in which they will be sent to the place of export

CENTRAL AMERICA

Between Mexico and South America are the six republics of Guatemala, Honduras, Salvador, Nicaragua, Costa Rica, and Panama. Five of these countries extend from the Atlantic to the Pacific, across the narrow neck of land which is called Central America. Salvador, however, is entirely on the Pacific side.

Besides the six republics there is British Honduras, the only European possession in this part of North America. It is a small, mountainous country located on the Gulf of Honduras, south of Yucatan.

The young, rugged mountains that border the Pacific Ocean in North America continue through Central America and South America. On the east, in Central America, there is a very narrow coastal plain, but on the west the mountains come to the seashore.

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Fig. 221. These oxcarts are used a great deal in Costa Rica and other Central American countries. Notice the heavy yokes on the oxen, the solid wooden wheels, and the rude framework which supports the canopy. What products do you suppose are hauled in these carts? What are the canopies for?

Climate. Central America lies between the tropic of Cancer and the equator, and therefore the winters are almost as hot as the summers. The heaviest rainfall comes during the summer, and more rain falls on the east coast than on the west coast, because the prevailing winds are the northeast trades. *See map on page 124.* At **Colon**, on the east coast, there is a yearly rainfall of 127 inches, and at **Greytown** the rainfall is 259 inches a year. Such abundant rainfall in a tropical region means dense forests, where there are sure to be gorgeously colored birds, many insects, and the germs of dangerous diseases.

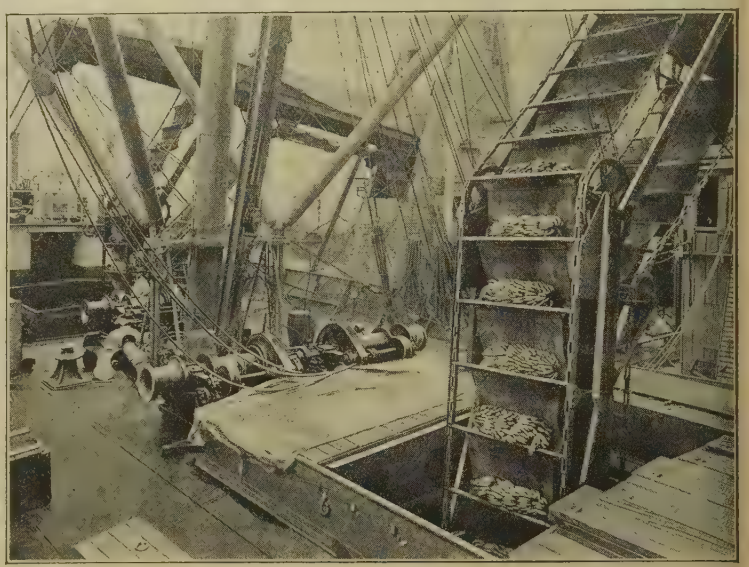

Fig. 222. The docks at Limon have steam conveyors which take the bananas right from the cars to the holds of the vessels. The conveyor is an endless chain of canvas pockets. Each pocket holds one bunch of bananas. To what countries are the bananas of Costa Rica sent?

Central America, like Mexico, has three zones of altitude, — *tierra caliente* (hot land), *tierra templada* (temperate land), and *tierra fria* (cold land) (p. 112).

Products. On the lowlands and in the valleys among the mountains immense quantities of bananas are raised (Figs. 220, 222). Tobacco and coffee grow on the hill slopes, and cattle, horses, and hogs are raised. In the mountains gold and silver are mined (Fig. 225); these are exported to Europe and the United States. The forests are rich in mahogany.

People. The white people in these countries are of Spanish descent, and the Spanish language is spoken almost entirely. In addition to the native Indians there are many negroes in these countries (Fig. 223). Many people from the United States have become interested in developing the coastal lowlands and have gone there to live. In the interior the Spanish-American homes and customs still prevail.

The trade of Central America is now largely with the United States. The countries border the "American Mediterranean," and their development is of immediate interest to the people in North and South America. They produce many useful articles and foods which we cannot secure in our own country.

Such hot, moist lands are not adapted to very active work. Nowhere in the world do we find much manufacturing in the tropics. The imports as shown on the map between pages 117 and 120 indicate clearly that the people send to the countries in the temperate zones for cotton goods, machinery, and other articles made in factories. Wheat cannot be raised in Central America, and wheat foods and flour must therefore be imported.

Problems and review questions. 1. Name the countries in Central America. 2. Why is the heavier rainfall on the northeast of the mountains? 3. What foreign language should you find most useful in traveling in the countries of Central America? 4. What kinds of food are exported? 5. What are the chief imports? 6. With what country is most of the trade? 7. In what part is the influence of the United States most clearly shown? 8. To what part of Central America should you go to see the Spanish or Spanish-American type of home and life?

Fig. 223. The natives of Guatemala build their houses by first putting up a few columns made of rough stones plastered together, and then filling the spaces between with thin sticks of wood. The high, pointed roofs are thatched with straw. What do these people do for their living?

Home work. 1. Read about volcanoes in a good reference book.

WEST INDIES

The West Indian Islands are arranged in a curve from the peninsula of Yucatan eastward and then southward to the northern coast of Venezuela. They are the tops of a young and rugged chain of mountains. The water about them is 20,000 feet deep in some places; and if the sea were withdrawn, there would be, in place of the islands, one of the greatest systems of mountains to be found in the world.

Courtesy of the Pan American Union

Fig. 224. Pineapples are grown very widely in the western part of Cuba. One crop can be raised each year, and each plant bears one apple. What other fruits does Cuba raise?

Bordering the shores of Cuba and Porto Rico, and in places on the other islands, there are coastal lowlands, but for the most part the West Indies are distinctly mountainous. Cuba, Jamaica, Haiti, and Porto Rico are called the Greater Antilles, and the smaller islands which form the eastern end of the curve are called the Lesser Antilles. Near them are the Leeward Islands and the Windward Islands. The Bahamas are a low group of coral islands north of Cuba. *See map between pages 117 and 120.*

The West Indies form the northeastern margin of the "American Mediterranean" and are convenient stopping places for vessels passing from Europe or the United States through the Panama Canal to Pacific coast ports. The passageways between the islands are rapidly becoming great thoroughfares for modern traffic, and the islands prove convenient coaling stations for the various navies of the world.

Climate. Most of the West Indies lie between the tropic of Cancer and the equator. The temperatures are therefore hot during the summer and warm during the winter. The latitude of these islands brings them into the belt of the moisture-laden northeast trade winds.

Courtesy of the Pan American Union

Fig. 225. These boys are sorting ore at the Rosario mine in Honduras. This mine is located near Tegucigalpa, and has been worked continuously for thirty years. It has produced millions of dollars' worth of gold and silver. What are the other important products of Honduras besides its mineral ores?

Fig. 226. This is a sugar-cane field in Cuba. The cane grows in single stalks and when full grown it stands from eight to twelve feet high. As soon as it ripens, the cane is cut by hand, stripped of its leaves, loaded upon carts, and hauled to the sugar mills to be crushed

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Fig. 227. Here the cane is passing up a belt conveyor into the mill, where it is crushed between great rollers to squeeze out the juice. Then the juice is crystallized, and the raw sugar is ready for export. Cuba is the world's largest exporter of sugar. What countries buy Cuba's sugar?

The southwest, or leeward, sides of the ranges are much drier than the northeast sides. Where there is abundant rainfall, tropical vegetation grows luxuriantly, and such fruits as pineapples, coconuts, and bananas are grown.

Products. On the lowlands bordering the coast there are large sugar and tobacco plantations. Coffee is also grown on these islands. The agricultural products are exchanged for manufactured goods made in the United States and Europe. *See map between pages 117 and 120.*

The royal palm, which grows luxuriantly in the West Indies, is a valuable tree to the native people. It reaches a height of from 60 to 80 feet and is covered with great green leaves. A medicine is distilled from the roots, the trunks are used as timber for building houses and furniture, and the leaves are often used to thatch houses. The stems of the leaves are made into baskets; hats and a certain kind of cloth are woven from the fibers of the leaves. The seeds are excellent for fattening hogs, and the bud found at the top of the tree is eaten as a vegetable.

Home work. Read about the uses of other kinds of palm trees.

Cuba is the largest of the West Indies, and is an independent republic. Through the center of the island is a mountain range, and the plantations are near the coasts. **Habana**, the capital and chief city, is located on an excellent harbor (Fig. 228), and from that port vessels leave for Europe and the United States (Fig. 230). **Santiago** also has a good harbor. It is situated on the south side of the island, near the eastern end. Iron has been discovered near by, and this is shipped to the United States.

The chief products of Cuba are sugar (Figs. 226, 227) and tobacco. Nearly half of the cultivated land is planted with sugar cane. More tobacco is raised in Cuba than in any other of the West Indian islands. The tobacco raised here is grown on the sheltered southern slopes of the mountain ranges and is valued especially for its fine flavor. Large numbers of cattle, horses, and mules are also raised in Cuba. The forests contain valuable supplies of mahogany and cedar. The cedar is used in the manufacture of cigar boxes, which are filled at Habana with cigars made from the tobacco grown on the island.

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Fig. 228. This is part of the city of Habana as it looks from the Cabañas fortress. The narrow strait in the foreground leads into the harbor. Habana is the capital and chief port of Cuba. More merchandise enters and leaves Habana than any port of the United States except New York. When Cuba was taken by the United States in 1899, Habana was a dirty, unhealthful city, because the Spaniards had no care for sanitation. The Americans cleaned the city thoroughly, and to-day it is a big modern port, with large, fine buildings, good streets, and excellent docks. Locate Habana on your map

MAP STUDIES — MEXICO, CENTRAL AMERICA, AND THE WEST INDIES (Between Pages 117 and 120)

1. With what countries is the chief commerce of Mexico? 2. Is Mexico noted for its industrial life or for its mining and agricultural life? 3. What climate should we expect to find in countries whose products include sugar, cotton, bananas, coffee, and rubber?

4. What climatic factors prevent many of the Mexican people from being very industrious? 5. What is the chief kind of cloth used by the Mexicans? 6. Why do they not buy more woolen clothes? 7. What are the chief mineral resources of Mexico?

8. What kinds of fuel are found in Mexico? 9. Name the two most important seaports. 10. In what kind of region is the capital of Mexico located, — mountain, plain, or plateau? 11. Name and locate seven other important cities in the interior of Mexico.

12. From what ports in Central America do great quantities of bananas come? 13. What other food supplies come to the United States from Central America? 14. What European nation possesses land in Central America? 15. What

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Fig. 229. Here is an oxcart such as many Cubans use on their farms. This farmer raises sisal hemp, which you can see beyond the oxen. The sisal looks like a century plant, and its fiber is used to make rope and twine. It is a cheaper rival of Manila hemp

countries of Central America extend from the Gulf of Mexico or the Caribbean Sea to the Pacific Ocean? 16. What are the chief food supplies that we receive from the West Indies? 17. What supplies go from these islands to Europe?

18. Do the people of the West Indies do most of their own manufacturing, or do they import manufactured goods? 19. Which is the largest of the West Indies? 20. Which of these islands belong to the United States? 21. What other countries have possessions among these islands?

22. What are the principal seaports of the West Indies? 23. What great ocean current passes between Cuba and Florida? 24. Which side of the islands is the better watered? *See map on page 124.* 25. What winds bring the rains?

26. What large city in Pennsylvania is in about the same longitude as the city of Panama? 27. What large cities in the United States are about as far west from Greenwich, England, as the city of Guatemala? 28. Which is farther from the equator, — San Juan in Porto Rico or Bombay in India? 29. What capital city in South America is almost directly south of New York?

Courtesy of the Pan American Union

Fig. 230. Ships from all over the world come to Habana, and as many as a thousand of them can anchor in the harbor at one time. The docks are always crowded and busy. The carts in this picture are loaded with Cuban products for export. Name some of these products

Jamaica is a British possession. Most of the natives are negroes, but there are some English, some Chinese, and some Hindus living on the island. The exports are like those from many of the other tropical countries, — bananas, coconuts, sugar, and coffee, — and here, as in other tropical countries, cotton goods and flour must be imported from the northern countries. Most of the trade is now with the United States.

The Bahamas belong to Great Britain. About twenty of these islands are inhabited, but there are many that are uninhabited. In the waters near the islands sponges and turtles are obtained. On the land pineapples, oranges, and large quantities of the sisal plant, valuable for fiber, are raised. Some of the pineapples are canned for export. Many of the native people are skillful in weaving the sisal fiber and in making tortoise-shell goods from the shells of the turtles.

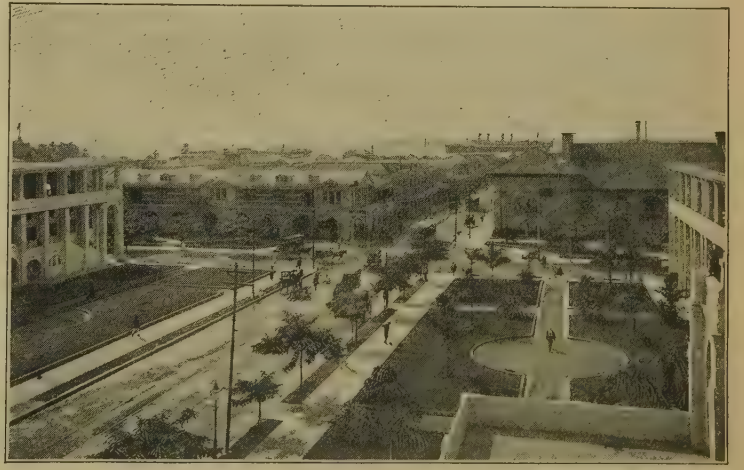

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Fig. 231. This is the main street of Kingston, the capital of Jamaica. In the distance is the broad, sheltered harbor. Kingston was destroyed by a terrible earthquake in 1907, but it has been rebuilt and is a busy, prosperous city. The new buildings are made of steel and concrete. Can you explain why?

Map Plate, Patented July 5, 1921 · Method of Making Maps, Patented July 5, 1921

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Fig. 232. This is a view of Port au Prince, the capital of the Republic of Haiti. It is located at the head of a deep bay on the western side of the island and is the chief port and commercial center of the republic. What are its exports and imports?

Haiti. The island of Haiti is divided into two negro republics. The Dominican Republic, in the east, is a Spanish-speaking country, with **Santo Domingo** as its chief seaport; the Republic of Haiti, in the west end of the island, is a French-speaking country; **Port au Prince** is its chief city and port (Fig. 232). These countries have suffered much from misgovernment. The principal occupation of the people in these two republics is agriculture. Haiti raises coffee of excellent quality for export. Other products are cacao, tobacco, and cotton, but none of them are raised in large enough quantities to be important commercially.

Home work. 1. Find out how sponges are obtained and prepared for the market. 2. Find out what you can about the Gulf Stream.

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Fig. 233. Trinidad has many cacao plantations. These boys are plantation hands at work husking cacao pods. They cut open the pods with their long, sharp knives, and scrape out the seeds, which are allowed to ferment for a while and are then dried in the sun. What other countries raise cacao?

TRINIDAD

This island is a British possession located just off the coast of Venezuela. The moist, warm, tropical climate is favorable to the growth of sugar, coconuts, and the cacao tree. The seeds of the cacao tree are used in the preparation of cocoa and chocolate, and the oil in the seed is called cocoa butter (Fig. 233).

Trinidad is, however, remarkable for a very unusual lake. It is a lake of nearly solid asphalt. A crust

© E. M. Newman

Fig. 234. These men are digging asphalt from the great pitch lake on the island of Trinidad. The lake covers 90 acres and is at least 100 feet deep. Its surface is covered with a crust of asphalt; but when this is removed, the liquid pitch oozes out. Of what use is asphalt?

forms on the asphalt, which is broken up and shipped to many countries of the world, where it is used in paving streets (Fig. 234).

BERMUDA ISLANDS

This group of low coral islands is located in the Atlantic Ocean, about 600 miles southeast from New York. They are British possessions and are used as a naval station. Corals grow here in the warm, shallow sea water on a platform which is probably part of an ancient volcano cut off a little below sea level by wave action. The coral skeletons have been broken by the waves and ground into sands, and at a time when the sea water was lower, such coral sands were blown into dunes.

The soil of the Bermuda Islands is not very fertile, but it is used for gardening the year round. Fresh vegetables from Bermuda are supplied to the United States markets during the northern winter season.

These islands are a very attractive winter resort. On days when the sea is calm one may go out in a glass-bottomed boat and see the living corals. Their homes appear like a fairyland, and swimming in and out among the delicate coral forms there are hundreds of the brilliantly colored fish that also like to live in warm waters.

Problems and review questions. 1. If the sea waters were withdrawn, what would the West Indies appear to be? 2. What is the origin of most of the West Indies? 3. How were the Bahama Islands made? 4. What winds bring rain to these islands? 5. What foods do we secure from the West Indies? 6. What uses are made of the royal palm?

7. Which of the West Indies belong to the United States? 8. What language is most commonly spoken in these islands? 9. What nations now have possessions among them? 10. For what is the island of Trinidad most famous?

11. How far are the Bermuda Islands from New York? 12. To what country do they belong? 13. Of what value are they to that country? 14. Why is it possible to raise vegetables the year round in the Bermuda Islands? 15. At what season of the year should you most enjoy visiting Bermuda? Why?

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Fig. 235. Telluride, Colorado, is typical of the many prosperous mining towns which have grown up in the young, rugged mountains of western North America because of the wealth of mineral ores which they contain. Can you describe the life of the people here?

THE CONTINENT OF NORTH AMERICA

Now that we have traveled into the various portions of North America and studied the life in each nation, we can make a more intelligent study of the continent as a whole. This will be in some ways a summary.

Physical features. The map on page 122 shows the arrangement of the natural regions. All of the old, worn-down mountains are in the eastern section. In the west there are young, rugged mountains and high plateaus. Along the Atlantic coast in the United States and Mexico, through the great interior of the continent, and on a portion of the Arctic coast, there are lowlands.

The Atlantic coast has been depressed. This has caused islands, deep inlets, bays, and estuaries, and has given the coast many excellent harbors. North of San Francisco the Pacific coast has been depressed, and another series of inlets with harbors has been the result.

Natural resources. In the mountain regions and in some of the neighboring plains and plateaus of the eastern part of North America are some of the large supplies of coal, iron, oil, and gas. These resources, with water-power, waterways, and railroads, have made possible a great industrial development near the Atlantic seaboard. The iron and copper of the Lake Superior region have played a very important part in the development of industries in Canada and in the United States. The coal, oil, gas, lead, and zinc of the Mississippi Valley have been immensely valuable. The forests have furnished lumber, which was used for building houses and factories and for making furniture and many other useful articles.

Alaska, British Columbia, our western states, Mexico, and Central America have all benefited from the rich stores of gold, copper, silver, lead, zinc, and many other minerals near the western margin of the continent (Fig. 235). The water-power in many parts of North America suggests great possibilities for the future.

Farming and grazing lands. All the lowlands except those in the extreme northern latitudes are agricultural lands (Fig. 236). A nation in the temperate zone, with a large, well-watered plain where there are fertile soils, is fortunate. Both Canada and the United States have broad expanses of such fertile lands. Mexico and Central America are less fortunate.

Most of the nations in North America have excellent pasture lands. The irrigation of semiarid lands is opening up vast areas to settlement and making it possible for the people to raise larger and larger supplies of food.

Life in the Far North. The extreme northern parts of North America are in the north frigid zone, and most of the people who live there are Eskimos. Life is very difficult in this cold region, where food is often scarce (Fig. 237). These people must depend largely upon game and fish for their food, but some of them are fortunate now in having herds of reindeer, which furnish them with food. In addition the skins of the reindeer are used by the Eskimos for clothing and for making their huts.

Fig. 236. These men are harvesting oats on one of the lowland plains of the United States. Why is such a region particularly favorable to agriculture? What zone is the most fortunate location for such plains? Why? What North American country has the greatest agricultural possibilities?

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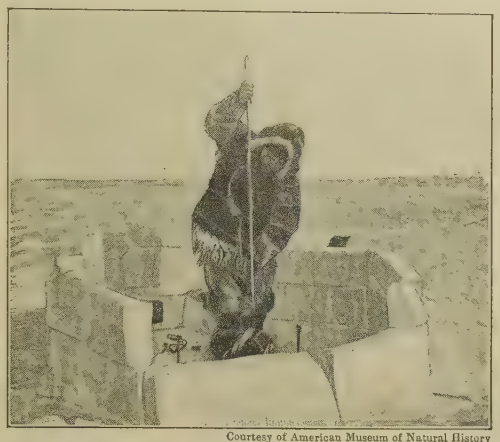
Life in the Far South. A part of Mexico, all of Central America, and most of the West Indies are situated in the torrid zone. The climate here is very hot, except in the mountainous regions. Food plants grow in abundance, and the inhabitants can make a living with little effort (Fig. 238). As a result most of the native people do not work hard, and the white people who migrate to these lands soon learn to take life very easily. On the windward sides of these lands the heat and moisture are so excessive as to produce conditions unattractive to white people.



Courtesy of American Museum of Natural History

Fig. 237. This Eskimo, who lives in the Far North, is harpooning a seal. Notice his fur clothing. Contrast his everyday life with that of the people shown in Fig. 238

Life in the temperate zone. Most of North America is in the temperate zone, where the climate is variable. The cold winters and warm summers quicken the thoughts and actions of the people. In this zone it is necessary to provide warm homes and to store up food for the winter season. This helps to make the people industrious. The comforts of life are more readily obtained than in the arctic countries, and yet life is not so easy that the people become lazy. Work must be done, but there is time for recreation and pleasure. The beautiful lakes, the mountains, and the seashore draw the people away from city homes during their vacations.

Future. As yet much of North America is not densely populated, though most parts have been explored. There are places in the deserts, among the high mountains, and far to the north where white men have never been, but such places will not be needed until the other lands are much more crowded. Forests may be cleared from vast areas, and thus more agricultural lands may be secured. Thousands of acres may yet be brought under irrigation and made attractive for settlement. More swamp lands will be drained. With a greater knowledge of soils and crops a much larger production to the acre will be secured. More mines will certainly be opened, larger factories will be built, seaports will be improved and commerce increased. The continent offers white people unusual opportunities for the advancement of civilization, and with good governments these nations should continue to grow in strength and prosperity.

© Keystone View Co.

Fig. 238. These are natives of the Far South, where life is easy. They live out of doors most of the time, and their clothing consists of simple cotton garments

MAP STUDIES

1. Where are the young, rugged mountains of North America? 2. What are the chief ranges of young, rugged mountains? Make a list, beginning at the north. 3. What are the names of the plateaus between the western mountain ranges? Make a list of the great plateaus, beginning at the north. They have hills and mountains rising above the general plateau level, and in places there are very deep canyons. *See map opposite page 124.*

4. Where are the old, worn-down mountains of North America? 5. Name and locate the coastal plains of this continent. 6. In what country is the greater part of the Central Plains region located? 7. Into what countries do the Great Plains extend? 8. What country in North America has the most extensive lowlands?

9. Why are there so many lakes in the northern part of the continent? *See Fig. 14.* 10. Explain the islands and the irregular coast of British Columbia and Alaska.

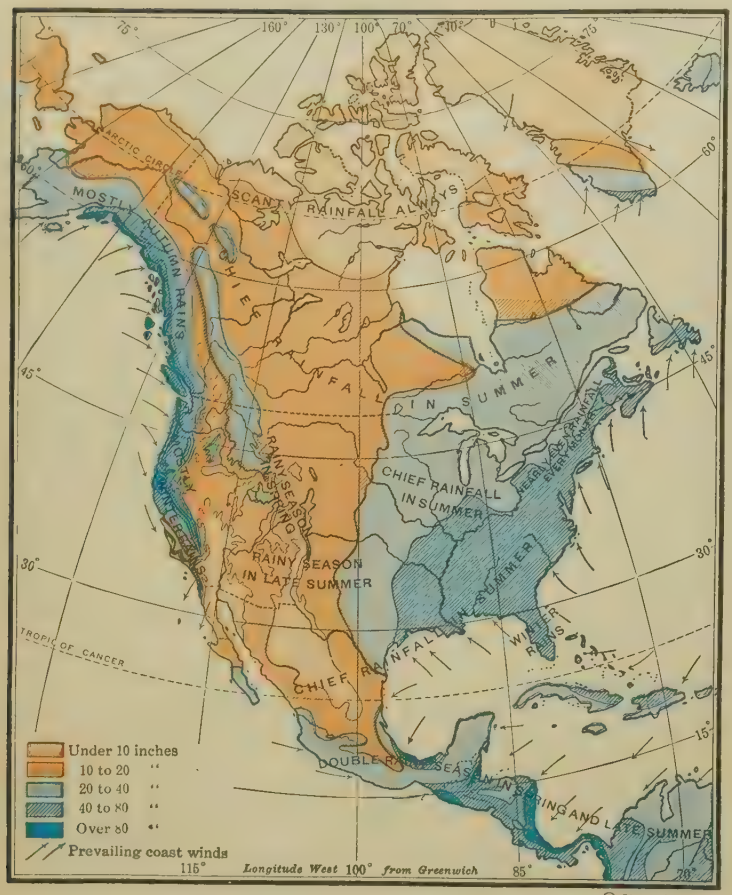
11. If you were approaching Greenland, what kind of scenery should you expect to see? 12. What cape in North America is nearest to Asia? 13. What land connects North and South America? 14. Along what part of the Atlantic coast are there clear signs of sinking of the land?

15. Where are the best harbors of North America? 16. Beginning in Alaska and following around the continent, select the five largest rivers in North America. Look in the Appendix and see if you have chosen the right ones.

17. What is the longest tributary to the Mississippi River? *See tables in Appendix.* 18. Where is the north magnetic pole?

19. Where is life for the native people very difficult? Why? 20. Where is life for the native people very easy? Why? 21. Why do white people prefer the temperate climates? 22. How may North America be made more suitable for an increasing population?

23. Where are the well-watered farming lands in North America? 24. Where has farming been made possible by means of irrigation? 25. What cape near Boston is in about the same longitude as Cape Horn? 26. What country in North America is in about the same latitude as the Sahara Desert? Is any part of that country a desert region? *See map opposite page 124.* 27. What mountain peaks in the United States are about as far north of the equator as Mt. Vesuvius in Italy? 28. What point in Alaska is about as near the north pole as North Cape, Norway? 29. Through what countries in North America does the arctic circle pass?


Under 10 inches
10 to 20 "
20 to 40 "
40 to 80 "
Over 80 "
Prevailing coast winds
Longitude West 100° from Greenwich
MOSTLY AUTUMN RAINS
SCANT RAINFALL ALWAYS
CHIEF RAINFALL IN SUMMER
RAINY SEASON IN LATE SUMMER
CHIEF RAINFALL IN WINTER
DOUBLE RAINY SEASON IN SPRING AND LATE SUMMER
TROPIC OF CANCER

Average annual rainfall in North America

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Distribution of people in North America

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COMPARATIVE MAP STUDIES

1. What is the annual rainfall on the Atlantic and Gulf Coastal Plain? 2. Why should the Appalachian Mountains be covered with forests, in contrast to many of the western and southwestern mountains?

3. What is the annual rainfall in the Central Plains? 4. Why should there be so many rivers in the Central Plains? 5. What occupations do the geographic conditions in the Central Plains favor? 6. In going from Lake Michigan to the Rocky Mountains, what large rivers must be crossed?

7. Why do the plains become semiarid near the mountains? 8. What places in the United States seem to be most favorable for crossing the mountain area to the Pacific coast? 9. Which would take you through the drier districts, the northern route or the southern route?

10. Why is there so little rainfall in the Great Basin? 11. Explain the presence of forests among the Rocky Mountains of the United States. 12. What is the average rainfall along the Pacific coast of British Columbia? Why is it so heavy? The prevailing westerly winds bring moisture to this coast.

13. When is the rainy season on the Pacific coast? 14. Why do the trees not extend to the northern edge of the continent?

15. Explain the extent of the tundra. 16. Asiatic wolves have been seen in Alaska. How do you suppose they reached there? 17. Why are there not more extensive forests in the interior of Alaska? 18. Explain the presence of glaciers in Alaska. 19. Why is the route from Hudson Bay to Europe open only a few months in the year? 20. Where is the rainfall in Greenland the heaviest? Why?

21. Explain the dry condition of the Mexican Plateau. 22. Why should the forests of Central America and the northern portion of South America be different from those of our southern states? 23. What winds bring rain to Central America and to the West Indies?

24. The relief and vegetation map represents summer conditions. If a map had been made for the winter, what bodies of water should have been shown as frozen? About how far south should a covering of snow have been shown?

25. Does any part of the United States remain green in winter? 26. In what parts do people live out of doors in winter? Where are the winter resorts in this continent? 27. The rainfall is in general heaviest near the coasts. Explain this.

28. What prevents the moisture-bearing winds from getting into the northwestern interior? 29. Which winds would commonly have moisture in them, those that start over the ocean and move toward the land or those that start over the land and move toward the ocean? Why?

30. What parts of North America are too dry for agriculture without irrigation? 31. Where is the growing season too short to encourage agriculture? 32. Why should certain places have a dense population? Give examples. 33. Why should certain places have a sparse population? Give examples. 34. Explain each of the areas of dense population.

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Fig. 239. The great falls of the Iguassú River, on the boundary between Brazil and Argentina, are often called the Niagara of South America. They are nearly two miles wide, and their height varies from 208 feet on the Brazilian side to 176 feet on the Argentine side. Some day the water-power of these falls will be used for industry. When that time comes, Brazil and Argentina will have to make some international agreement about the use of the water, just as the United States and Canada have agreed about Niagara. Locate these falls on your map. Where does the Iguassú rise?

SOUTH AMERICA

INTRODUCTION

South America to-day is a land of great opportunities. It is a land with varied resources, with many products which the world demands, without a dense population, and with much land awaiting settlement. There are rich resources of gold, silver, copper, iron, and nitrate. Some coal and oil have been discovered, and more will probably be found. Most of the people there live near the seacoast, much as people did in North America one hundred and fifty years ago.

In order that South America may be fully developed, harbors must be improved, more railroads must be built into the interior, harmful insects must be killed off, greater use must be made of the wonderful hard woods of the forests, and more people must go to live there as miners, farmers, or stock-raisers.

The people of the United States and Europe are becoming more and more interested in South America, and many are studying Spanish and Portuguese, so that they may understand and trade with the people there.

Trade routes. The eastern ports are about as near to Europe as they are to New York; but now that the Panama Canal has been opened, the western ports are quickly reached by steamer from our eastern cities. Plans have been made for a great railroad to go from the United States through Mexico, Central America, and South American countries as far as Chile. It will follow the high plateaus between the ranges of the Andes. Certain sections of this road have been built. Turn to Plate B in the Appendix and note the position of South America, and see how the trade routes connect South America with all other parts of the world.

People. On Plate A in the Appendix find the part of South America where Columbus landed, the countries that the Spanish explored, and where the Portuguese first came to settle. Many of the native peoples of South America are uncivilized as yet, and very few have been educated. There are many negroes, especially in the tropical countries. They were brought from Africa in the early days of European colonization to work on the sugar plantations of Brazil. The white people are descended from Europeans, — for the most part from the Portuguese who first settled Brazil and from the Spanish who colonized the rest of South America. In the last thirty years thousands of Italians and Germans have emigrated to South America. There are many people of mixed blood in South America, for some Europeans married the native Indians in the early days of settlement, and in the tropical countries the negro blood is mixed with the European and Indian. The white people and those of mixed descent have charge of affairs, and they are rapidly improving the social, political, and industrial conditions in the different countries.

Governments. South America is a land of ten republics and three small colonies, British, Dutch, and French Guiana. The form of government in each of the republics is somewhat like that of the United States.

Physical features. The natural regions of South America are arranged like those in North America. *See map on page 126.* In the west there are bold, rugged mountains that are very youthful. Between the mountain ranges there are plateaus, although they are not so extensive as the great plateaus of western North

SOUTH AMERICA
PHYSICAL MAP
SHOWING NATURAL REGIONS
Scale of statute miles
0 50 100 200 400 600 1000
Scale of kilometers
0 100 200 500 1000 1500
Lowlands
Uplands and plateaus
Old, worn-down mountains
Young, rugged mountains
Boundaries of natural regions
Average summit elevations in natural regions indicated thus: 500 to 1000 ft.
Comparative Area
SPAIN
PORTUGAL
194,783 sq. miles
224,234 sq. miles
Madrid
Lisbon
Longitude West from Greenwich
ATLANTIC OCEAN
PACIFIC OCEAN
CARIBBEAN SEA
Caribbean Lowlands
Orinoco Lowlands
Guiana Highlands
Andes Mountains
Amazon Lowlands
Brazilian Highlands
Plateau of Peru
Plateau of Bolivia
Plateau of Central Brazil
Pampa
Patagonian Plateau
Equator
Tropic of Capricorn
Mouths of the Amazon
Falkland Islands
South Georgia
Juan Fernandez Islands
Desventurados Is.
Chiloe I.
Chonos Archipelago
Tierra del Fuego
Strait of Magellan
Cape Horn
Panama Canal
Lake Titicaca
Gulf of Darien
Gulf of San Matias
Gulf of San Jorge
Bay of Blanca
Plata R.
Mouths of Congo R.
Mouths of Niger R.
Victoria Falls
Cape of Good Hope
Fiji Is.
Tasmania
Sydney
Malakka Strait
Mt. Kilimanjaro
Mt. Mitchell
Niagara Falls
Cape Farewell, Greenland
Fernando Noronha I.
Trinidad I.
Margarita I.
Curaçao I.
Grenada I.
Santa Catharina I.
Marajó I.
Rio de Janeiro
São Paulo
Santos
Cape Frio
Victoria
Ouro Preto
Caravellas
São Salvador (Bahia)
Recife (Pernambuco)
Maceió
Joazeiro
Jatoba
Belem (Pará)
São Luiz (Maranhão)
Parnahyba
Fortaleza
Natal
C. St. Roque
Manáos
Iquitos
Tabatinga
Porto Velho
Riberalta
Trinidad
Cuyaba
Matto Grosso
Goyaz
Uberaba
Corumbá
Asuncion
Tarija
Sucre
Potosi
Oruro
La Paz
Arequipa
Mollendo
Arica
Iquique
Antofagasta
Taltal
Cruz Grande
Coquimbo
Valparaiso
Santiago
Concepción
Valdivia
Puerto Montt
Punta Arenas
Cerro de Pasco
Callao
Lima
Trujillo
Paita
Moyobamba
Guayaquil
Quito
Esmeraldas
Buenaventura
Medellin
Bogotá
Cali
Cartagena
Barranquilla
Colon
Panama
Maracaibo
Caracas
Puerto Cabello
Valencia
Ciudad Bolivar
Georgetown
Paramaribo
Cayenne
Montevideo
Buenos Aires
Rosario
Córdoba
Santa Fé
Mendoza
La Rioja
Tucumán
Azul
Bahia Blanca
Mar del Plata
C. San Antonio
Rio Grande do Sul
Porto Alegre
Lagoa dos Patos
Uruguay R.
Paraná R.
Paraguay R.
Madeira R.
Tapajoz R.
Xingú R.
Tocantins R.
Parnahyba R.
São Francisco R.
Amazon R.
Negro R.
Orinoco R.
Magdalena R.
Cauca R.
Meta R.
Apure R.
Demerara R.
Corentyn R.
Maroni R.
Oyapock R.
Essequibo R.
Branco R.
Purús R.
Juruá R.
Javary R.
Napo R.
Putumayo R.
Yapurá R.
Iça R.
Guaporé R.
Beni R.
Mamoré R.
Pilcomayo R.
Bermejo R.
Salado R.
Colorado R.
Negro R.
Chubut R.
Deseado R.
Itapura Falls
Guaira Falls
Iguassú Falls
Paulo Affonso Falls
Madeira Falls
Mt. Illimani 21,186
Mt. Misti 19,200
Cotopaxi 19,498
Mt. Chimborazo 20,702
Aconcagua 23,080
Sta. Cruz de la Sierra
Sta. Isabel
Nova Olinda
Ega
Tefé
Fonteboa
Coary
Codajás
Parintins
Obidos
Almeirim
Monte Alegre
Itaituba
Santarem
Manacapuru
Itacoatiara
Serpa
Maués
Barcellos
Thomar
Mocajuba
Cametá
Breves
Soure
Arumanduba
Pará
Maranhão
Tutoya
Jurua
Purús
Madeira
Tapajoz
Xingú
Tocantins
Parnahyba
São Francisco
Araguaya
Negro
Amazon
Orinoco
Magdalena
Cauca
Meta
Apure
Demerara
Corentyn
Maroni
Oyapock
Essequibo
Branco
Purús
Juruá
Javary
Napo
Putumayo
Yapurá
Iça
Guaporé
Beni
Mamoré
Pilcomayo
Bermejo
Salado
Colorado
Negro
Chubut
Deseado
Itapura
Guaira
Iguassú
Paulo Affonso
Madeira

Courtesy of the Pan American Union

Fig. 240. The Strait of Magellan is bordered by high, snow-capped mountains which descend abruptly into the sea, making some of the most beautiful scenery in South America. The strait is very dangerous for navigation, and many ships are wrecked here. How should you travel from New York to Valparaiso?

America. In the east and northeast, just as in North America, there are areas of old, worn-down mountains; and between the mountain regions, extending north and south for the full length of the continent, there are lowlands.

The west coast is bold and rocky like the west coast of North America. Far to the south the coast ranges have sunk and now form an archipelago and irregular coast, just as the coastal ranges of British Columbia and Alaska have sunk and formed groups of islands and wonderful inlets (Fig. 240).

Climate. Most of South America is between the tropics of Cancer and Capricorn, where there are hot winters as well as hot summers. The most densely settled portion, which is progressive and developing rapidly, is in the temperate zone. No part of the continent except near the tops of the high mountains has a long period of frosts. In the equatorial belt the rainfall is heavy, and it is also heavy where winds from over the oceans blow against mountains or highlands. On the lee side of mountains there are deserts or semideserts as in northern Chile, in Peru, and in southern Argentina. *See maps on and opposite page 156.*

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Fig. 241. This is the Laguna del Inca, one of the beautiful lakes high up in the heart of the Andes, on the line of the Trans-Andean Railway

MAP STUDIES

1. How have the rivers assisted in the exploration of this continent? 2. Where are the young and rugged mountains of South America? 3. Give the names and locations of the old, worn-down mountains. 4. Why are the Brazilian Highlands so different from the Andes?

5. Compare the general distribution of mountains and lowlands in North and South America. Where are the old and the young mountains in each continent? Where are the lowlands of each continent?

6. Which continent has the more irregular coast line, North America or South America? Which has more good harbors? 7. What is the general elevation of the plateau of Bolivia? of the great lowland areas? of the Brazilian and Guiana highlands?

8. Between the high mountain ranges of Ecuador and Colombia there are narrow, plateau-like areas too small to show on the map. 9. Name five of the higher peaks of the Andes Range. 10. Name five of the larger rivers of South America. 11. Give the names of the three great lowland areas.

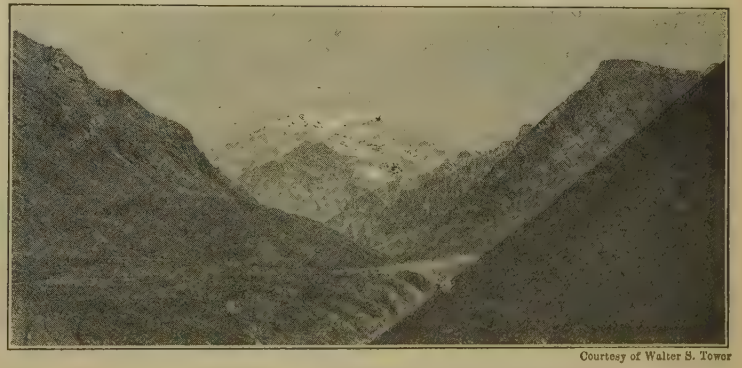
12. In which country is the Pampa? 13. Locate on the map the Iguassú Falls (Fig. 239). 14. Where is the highest lake in the world which is navigable for commercial purposes? 15. Locate two large deltas and one estuary. 16. Which coast has the better harbors?

17. What is the name of the land connecting South America with North America? 18. Trace the route of Magellan around the southern end of this continent. *See Appendix, Plate A.* 19. Fix in your mind the name of the southernmost cape in South America.

NATURAL REGIONS

Andes Mountains. The giant ranges of the Andes are at the western margin of the continent. Many of the peaks rise to 14,000 feet above sea level, and a few to more than 20,000 feet (Fig. 242). The highest peaks are volcanoes, and in the region of the volcanoes and throughout most of the length of these young, rugged mountains, earthquakes are common (Fig. 243). Volcanoes and earthquakes are signs of youth in mountains, and they usually mean that the mountains are still growing.

Brazilian Highlands. The Brazilian Highlands are a great forested tableland, from 2000 to 5000 feet high. The rivers of this region have carved wonderful gorges



Courtesy of Walter S. Tower

Fig. 242. The peak of Aconcagua (22,812 feet), on the boundary line between Argentina and Chile, is the highest mountain in the two Americas. The Trans-Andean Railway, which crosses the great wall of the Andes not far from this point, was completed in 1910

Fig. 243. Along the Andes in Ecuador are several snow-capped volcanic peaks. This is Chimborazo, which rises nearly four miles above the level of the Pacific Ocean, from which it can be plainly seen. Chimborazo has not erupted within historic times, and its crater has entirely disappeared

and developed beautiful waterfalls. In some places the land rises abruptly from the Atlantic coast, and in others it is bordered by a narrow coastal plain.

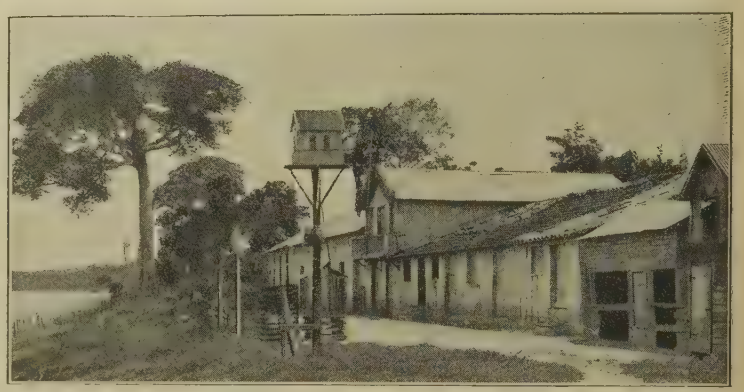
The southeast trade winds bring an abundance of rain to these highlands, and on their slopes there are forests and large areas of mixed grasses, where horses, cattle, and mules may graze. In some parts there are rich soils that yield excellent crops.

Guiana Highlands. The Guiana Highlands are also old, worn-down mountains. There is one peak which rises to over 11,000 feet, but most of the area is only from 3000 to 4000 feet above sea level. These highlands are also forested, and, like the Brazilian Highlands, are similar to the Laurentian Upland and some parts of the Appalachian Highlands of North America. There are deep canyons in the Guiana Highlands. The region is well watered and large areas are covered with grass. For this reason it is used chiefly for the raising of cattle.

Fig. 244. Lake Titicaca, which forms part of the boundary between Peru and Bolivia, is the highest body of water in the world which is navigated for commercial purposes. It is one hundred and forty miles long, and its surface is nearly two and a half miles above sea level. A line of steamers runs between the railroad terminals at Puno and Guaqui at opposite ends of the lake

Lowlands. The great plains of South America are the largest in the world. Long ago there was a sea between the Andes on the west and the highlands on the east. The rivers which flowed down from the mountains into this interior sea carried fine materials, depositing them on the sea bottom until finally the sea was filled up and transformed into a broad area of wonderful lowland plains. Parts of the lowlands are to-day just about at sea level, and during the rainy seasons the rivers overflow and flood these areas.

The Orinoco Lowlands in the north are grasslands called the *llanos*. Here thousands and thousands of cattle are raised. During the rainy season much of this country is under water; the people go about in boats, and their cattle leave for the hills. The homes near the rivers must be built on piles to prevent them from being flooded.



Courtesy of G. B. Roorbach

Fig. 245. Along the Amazon, from its mouth to Iquitos, Peru, are little trading stations like this. Here the river steamships call on their way upstream to deliver the manufactured goods which the natives need. On their way back they stop again to pick up the products of the country for export

The Amazon Lowlands form a vast, flat plain, most of which is covered by the most luxuriant tropical forest in the world. The tree-tops and vines are so thick that it is dark, or twilight, in the depths of the forest even when the sun is shining. The trees remain green throughout the year. Even such trees as shed their leaves in the fall in the temperate zone keep sending out fresh green leaves in this forest. The constant warmth and moisture help the trees to grow all the time.

Thousands of strange animals live in this tropical forest, such as the jaguar, alligator, anteater, and huge snakes. The howling monkeys, that have a leader called a chief howler, live here. One sixth of all the kinds of birds known in the world have been found here, and many of them have most brilliant plumage.

Fig. 246. Many of the natives of the Amazon Lowlands make a business of gathering Brazil nuts, which grow on a very tall tropical tree. The men in this view are washing the nuts and putting them into their boats, in which they will take them to the nearest Amazon trading station

Fig. 247. When the river boat calls at the trading station, the Brazil-nut traders put their crops aboard to be carried down to Belem. There the nuts are reshipped to other countries. What other products do the Amazon River boats bring out to Belem from the interior of the continent?

The great butterfly collections in the museums have been made largely in the Amazon forest. Insects are innumerable, and eighteen hundred kinds of fish have been found in the streams of the lowlands.

The northeast and southeast trades carry much moisture inland from the Atlantic. As they rise to cross the Andes they are cooled, and they are forced to give up their moisture on the east side of the ranges. Over eighty inches of rain falls there each year. The Amazon Lowlands are near the equator, where there is always a heavy rainfall and where the air is always very hot. Hot, damp conditions cause dense tropical forests and make it almost impossible for white people to live there.

When people go to live in this dense tropical forest, they find plenty of fish and game to eat, but vegetable foods are scarce (Fig. 248). A part of the forest must be cleared away and a garden planted. Little wheat can be raised here, but the natives make a flour from the roots of the manioc plant. Manioc bread is the common food of the natives in Guiana and Brazil. The roots of the manioc plant are gathered when they are one or two years old. They are washed and grated, and after the moisture is pressed out, the flour is roasted, and then it is ready to be used. Tapioca is made from this same plant.

The Paraná Lowlands are farther south and mostly in the temperate zone. Here the rainfall is a little less, and instead of great forests there are extensive grasslands, sometimes called savannas. *See map opposite page 156.* The Pampa, or great grassland of Argentina, is within this region. The lands of southern Brazil, of Uruguay, Paraguay, and Argentina, in the temperate zone, are best suited to white people.

Courtesy of G. B. Roorbach

Fig. 248. These Brazilian natives have just returned from a turtle hunt. The sand banks of the Amazon and its tributaries are inhabited by great numbers of turtles, which the natives catch and use for food. From the eggs they make a butterlike substance which is very popular

Problems and review questions. 1. Why do so many people from Europe and North America want to go to South America? 2. Name two languages commonly spoken in South America. 3. What European nations have recently sent many settlers to South America?

4. Why do most of the people in South America live near the coast? *See map on page 156.* 5. Is it shorter from Rio de Janeiro to London or to New York? *See Appendix, Plate B.* 6. What is the best route from New York to Valparaiso? 7. Plan out a trip to South America that you would like to take.

8. In what zone is most of South America located? 9. In what zone in South America is the population most progressive? 10. How many republics are there? 11. What countries are not independent? To what European nations do they belong? *See map on page 126.*

12. On what part of South America did Columbus land? 13. Name and locate the chief mountainous regions. 14. Name and locate the three large lowland regions. 15. Describe briefly each of the above regions. Use the map on page 126 and also the map opposite page 156.

16. Explain the formation of the islands on the Chilean coast. 17. Locate the Strait of Magellan, Cape Horn, and Punta Arenas, the southernmost city of the world. 18. Cape Horn rises 1406 feet above the sea. Is it on the mainland or on an island?

Courtesy of G. B. Roorbach

Fig. 249. These men are rubber gatherers of the Amazon Valley. Each day they tap the wild rubber trees and collect the sap. On the rack in front of them are the brownish-black balls of rubber which have been made by thickening the sap and curing it over a smoky fire

BRAZIL

Extent. This is one of the largest countries in the world. In an east-and-west direction it extends as far as from New York City to San Francisco, and in a north-and-south direction as far as from the arctic circle to the Gulf of Mexico. It is larger than continental United States and about half as large as all South America. It touches every other country on the continent except Chile and Ecuador, and has 6000 miles of seacoast. On the physical map (p. 126), we see that the Brazilian Highlands, the Plateau of Central Brazil, and most of the vast Amazon Lowlands are in this country.

Rivers. The Amazon River is the largest in the world; it is not the longest, for the Missouri-Mississippi River is longer, but it contains more water than any other river in the world. The amount of fresh water brought to the mouth of this river is so great that for more than 100 miles out to sea the water is fresh. The Amazon is about 4000 miles long, which is 600 miles more than the distance from New York to Liverpool. For 250 miles upstream from the mouth this river is 50 miles wide, so that it looks like a broad bay rather than a river. The main stream and the twenty-nine large tributaries have 27,000 miles of navigable waters, which is more than any other river system in the world. The northeast trades, which blow with greater force by day than by night, help the sailboats up the Amazon. The boatmen travel upstream by day, but when they want to come downstream they travel at night, so that they will not have the strong wind against them, and the current will take them along faster. During the rainy season the main stream rises from 20 to 50 feet, overflows, and becomes a chain of lakes. The tributaries frequently overflow their banks also and flood the country near them. This is the reason why so many of the houses near the rivers are built on piles.

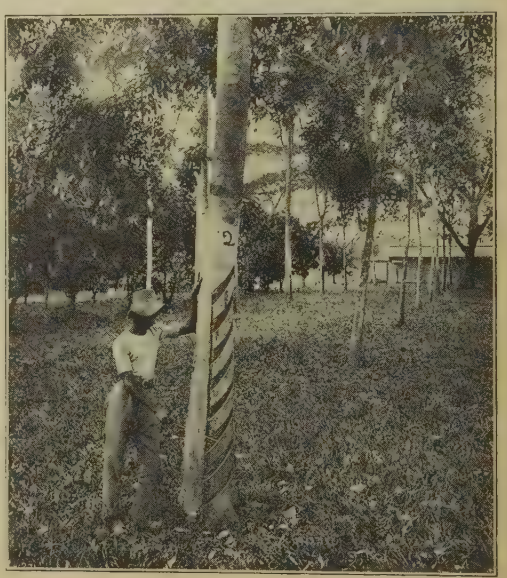


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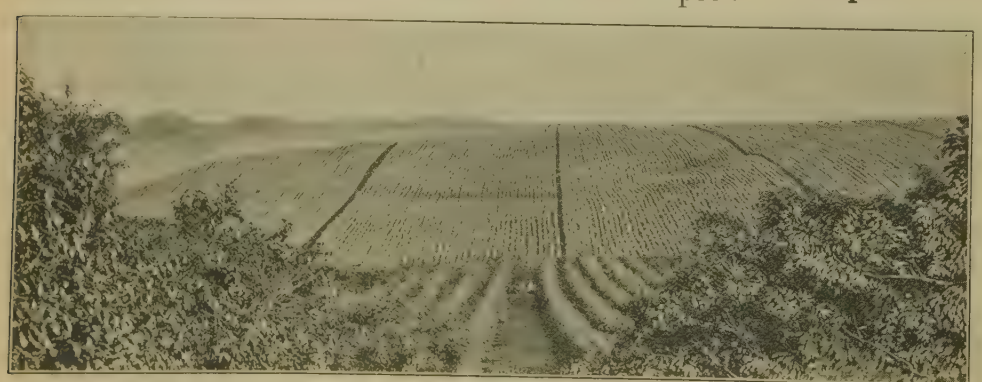
Fig. 251. In addition to the wild rubber trees, Brazil has many rubber plantations. This view shows the way in which the plantation trees are cut to make them bleed

Boats may go up the Madeira, the largest tributary, for nearly 500 miles to the lower end of the falls. There is a railroad from the lower end to the upper end of the series of falls and rapids, — a distance of about 200 miles, — and farther upstream one may again travel by boat far into the interior of Bolivia.



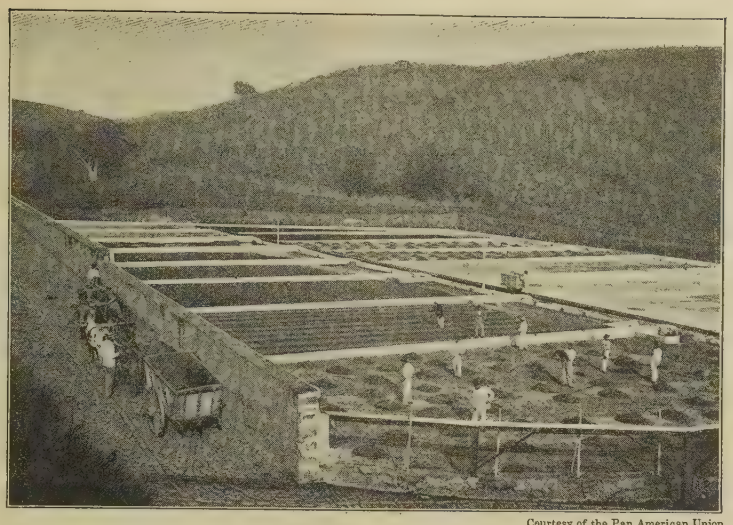
Courtesy of the Pan American Union

Fig. 250. This is one of the great coffee plantations which cover the upland districts of São Paulo, where the rich red earth and abundant rainfall provide perfect conditions for the coffee trees. The plantations often cover thousands of acres. The trees bear clusters of berries which look like dark red cherries. Inside each berry are two seeds, which are the coffee beans of commerce

People. If the Indians are counted, there are over twenty million people in Brazil. The Portuguese claimed this country by right of discovery. When they came to South America, they found many native tribes of Indians. To-day most of the Indian people live in the interior. Many of them have house-boats and live on the rivers part of the time, but they also have small villages, where they have cleared away the dense tropical forests. The population of this republic now includes many people from nearly every European nation, as well as some from Asia. Most of the white

people live in the larger cities along the eastern coast or in the farming country of southern Brazil.

Resources. In the highlands gold, copper, lead, iron, some coal and oil, and a remarkable number of diamonds have been discovered. The highlands have rich soils and are well watered. The Central Plateau is a great grassland where cattle, horses, and mules are raised. The Amazon Lowlands are overgrown with a tropical forest where there are thousands of rubber trees. There are also mahogany, rosewood, ebony, and cacao trees, besides many trees which yield valuable drugs, and others which yield Brazil nuts (Figs. 246, 247). The soils of the lowlands are very rich.



Courtesy of the Pan American Union

Fig. 252. These are the yards where the coffee seeds are spread out to dry in the sun after being separated from the pulp of the berries. While drying they are stirred frequently with wooden rakes. When thoroughly dried, the seeds are peeled and the beans sorted, graded, and put into bags for shipment

Climate. Most of Brazil is in the lowlands of the torrid zone. That means high temperatures. We learned on pages 128 and 129 that the rainfall is heavy in the Amazon basin and on the eastern slope of the Brazilian Highlands. In the upper basin of the São Francisco River, which is shut off from the Atlantic Ocean by highlands, there is an area of light rainfall. *See map on page 156.* Here irrigation is necessary for agriculture.

South of the tropic of Capricorn the temperatures are lower than near the equator, and there is less rainfall. That is a country of excellent grasslands.

Occupations. What have the people who came to settle in Brazil done with the great natural resources? Along the lower Amazon River, and on cleared parts of the lowlands near the eastern coast, they established great plantations of sugar, rice, and tobacco. After a time they learned to go far up the rivers and gather the crude rubber which the native Indian people brought in from their little camps in the forest (Figs. 249, 251). On the southern slopes of the Guiana Highlands and on the grasslands south of the tropical forests grazing has become the principal occupation of the people.

In the Brazilian Highlands near São Paulo and Rio de Janeiro there are wonderful coffee-producing lands, where four fifths of the coffee produced in the world is grown (Figs. 250, 252). Until a railroad was constructed up the mountain wall from Santos to São Paulo it was very difficult to get the coffee to the port. Now there is a remarkably well-built and well-equipped railroad that climbs 2500 feet in a short distance and connects the seaport with the great producing area. More coffee is carried over that road than any other road in the world. There are a few other railroads that start from the coast and, after reaching the highland surface, branch off in several directions into the interior.

Mining is becoming important in the Brazilian Highlands, and some day that industry will be much more developed. There are immense deposits of high-grade iron ore in the old, worn-down mountains, which the world is certain to need. Then more railroads will be built into the mountains, and, as the mining increases, it is likely that more ores will be discovered. Prosperous mining camps will undoubtedly be established in the highland area. The southern part of this region also contains bituminous coal, but the quality is so poor that at the present time it is not worth mining.

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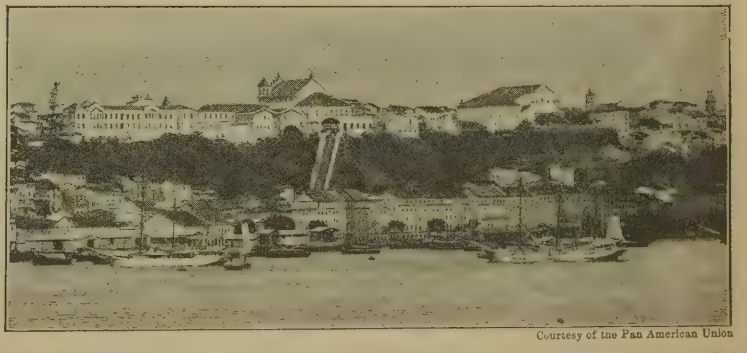
Fig. 253. This is Santos, the world's greatest center of coffee export. The São Paulo coffee district is covered by a network of railroads which bring the coffee to São Paulo, whence a single line takes it to Santos. Locate Santos on the map on page 145. To what countries is the coffee sent?



Courtesy of the Pan American Union

Fig. 254. São Salvador, the center of Portuguese rule in Brazil in colonial days, was the leading Brazilian port as long as sugar was the chief export of the country. Why is it no longer the leading port? Notice the escalator which connects the lower (old) city with the upper (new)

Courtesy of Walter S. Tower

Fig. 255. The Marine Depot at Rio stands on one of the many islands near the entrance to the harbor. Here the harbor master has his headquarters and can easily oversee the shipping which passes in and out. What are the chief reasons for the commercial importance of Rio?

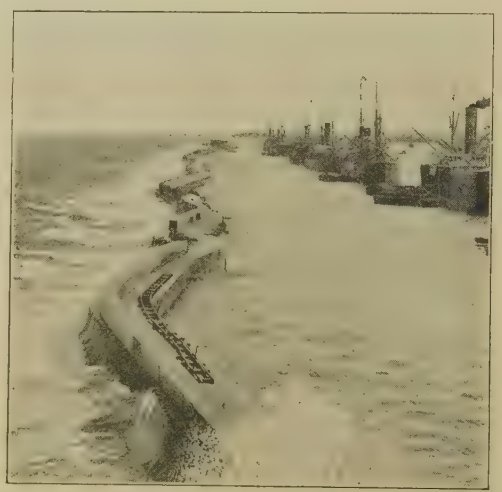
Toward the south, near Paraguay, the land is low and excellent for farming. Here the people raise a great deal of *yerba maté*, which is used in making a drink which is somewhat like tea.

Home work. In some good reference book read about the life of the natives who prepare the crude rubber for market.

Cities. **Rio de Janeiro**, the capital, with over a million people, is the largest city in Brazil and the second largest in South America. Buenos Aires is the largest. Rio is located on the most beautiful harbor in the world, where the largest vessels may anchor safely (Figs. 257, 259). This is a place where the land sank and let the ocean waters come in. Over a hundred little islands in the harbor are hills or low mountains with only their tops out of water. The city of Rio de Janeiro is built on narrow plains between the hills. In the older part, which is the business district, the streets are narrow. In the newer part there are wide avenues bordered by rows of beautiful palms, feathery bamboos, and tree ferns (Fig. 258). The homes in this part of the city are modern, and many of them are set in gardens of flowering tropical plants.

Santos is the port for **São Paulo**, the second largest city in Brazil. Santos is one of the busiest places in South America. Over 2000 vessels enter and leave the port each year, and about 15,000,000 bags of coffee are shipped annually (Fig. 253).

São Paulo is about 2000 feet above the sea and has a delightful climate. The air is warm during the summer days but cool at night. In winter there are sometimes slight frosts. The climate seems to help to produce vigorous men. There are excellent modern factories, where electricity and the best of machinery are used.



Courtesy of the Pan American Union

Fig. 256. The port of Recife is protected by a breakwater built on a reef which fringes the shore. Without the breakwater ships could not anchor at Recife safely. Explain why

São Salvador, which used to be known as Bahia, is the capital of the state of Bahia. Coffee, cacao, and cotton are the most important products raised in Bahia, and these products form the chief exports.

Recife, which is the capital of the state of Pernambuco, is situated on the fertile coastal lowlands of Brazil. Recife is one of the chief sugar centers in Brazil.

Both São Salvador and Recife are important seaports. *See Figs. 254 and 256 and the map on page 135.*

Belem, sometimes called Pará, is at the mouth of the Amazon, about a degree and a half south of the equator. It is an important rubber port.

From Belem large ocean vessels go up the Amazon to **Manáos**. Although situated nearly a thousand miles inland, Manáos has become a thriving city with many modern conveniences. The growth of Manáos is due partly to its location at the junction of the Negro and Amazon rivers and partly to the plentiful supply of rubber found in the neighboring forests.

Home work. Read about the work on a coffee plantation.

Summary. Without doubt you will always remember Brazil for its rubber and its coffee, but do not forget that Brazil is a large country, that grazing, farming, and mining are all very important, and that lumbering has great possibilities. A start has been made in manufacturing. There are cotton mills in Brazil, but they do not produce nearly enough cloth to satisfy the needs of the people, and so cotton cloth and cotton garments are

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Fig. 257. The Bay of Botafogo is part of the harbor of Rio. The avenue which encircles it was built on made land where there was formerly a mangrove swamp which caused terrible epidemics of yellow fever in Rio. Cleaning it out, draining, and filling have freed Rio from the fever

Courtesy of the Pan American Union

Fig. 258. The Avenida Rio Branco is the finest street in Rio and is the center of Brazilian art and culture. This view shows, on the left, the mosaic sidewalk and the Municipal Theatre, and on the right the Conservatory of Music, the National Library, and the Art Museum

imported into nearly every city. If someone should find more coal or oil, or if the people should use more of the water-power to make electricity, Brazil might undertake more manufacturing.

The waters from the Brazilian Highlands are carried off by the Uruguay, Paraná, and São Francisco rivers. These streams have many falls which offer opportunities for the development of water-power which should furnish electricity for cities, factories, and railroads (Fig. 239).

Future. One of the future problems for this large republic is the building of railroads into the interior. This work has already been started, and in time it will be possible to go by rail from Rio de Janeiro into any of the states of Brazil.

The development of railroads will in turn soon lead to the establishment of cities and to the spread of population into the interior.

With the establishment of inland cities another problem must be faced. The tropical forests are full of insect pests and dangerous animals, which must be killed before people can live safely in this part of Brazil. Finally, through education and the use of scientific knowledge the spread of tropical diseases must be prevented. When these things are done, more people will wish to live here and help to develop the wonderful natural resources.

Problems and review questions. 1. Compare the size of Brazil with that of the United States; with the continent of South America; with the continent of Europe. 2. Name three large tributaries of the Amazon River. Which tributary is the largest? 3. In what region does the Amazon rise? 4. How should you go from Belem, in Brazil, to Sucre in Bolivia? 5. Of what nationality were the early settlers of Brazil? 6. In what part of the country do their descendants live? 7. Why have so many people from the nations of Europe come to live in this republic? 8. Where do most of these people live? Why? 9. What is the official language of Brazil? 10. How do you explain this? 11. Name and locate the capital and four other large cities. 12. What fact should you associate with each city named?

13. What are the chief products shipped from each seaport? 14. What should you remember about the Amazon Lowlands? 15. Which city in Brazil is very near the equator? 16. What is the chief export from that city? 17. What city on the Amazon River can be reached by large ocean-going vessels? 18. For what is the Central Plateau of Brazil valuable?

19. Why is it difficult to live or to travel in the tropical forest? 20. What things will help the development of Brazil? 21. What countries in South America do not border on Brazil?

Home work. 1. On an outline map of South America color the boundaries of each country. Print in the names of the countries. 2. Locate and name the capitals. 3. Locate and print in Belem, Valparaiso, Callao, Guayaquil, Santos, São Paulo, Manáos, Rosario, São Salvador, Recife, La Guaira, Santa Marta, Buenaventura, Punta Arenas, Córdoba, Porto Alegre, La Plata, Villa Rica.

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Fig. 259. This is an aëroplane drawing of the country bordering the Bay of Rio de Janeiro. Explain the irregularity of the coast line here. Why is such a coast line favorable for Rio? Describe the land surface on which Rio is built. What is the vegetation here? *See map opposite page 156.* Why has Rio become a more important port than Belem, Recife, or São Salvador? What are its chief exports and imports? With what countries does Brazil trade most? Can you explain your answer?

MAP STUDIES

1. Where is the great rubber-producing region? Where is this rubber sent? 2. Why do they not raise more foods in the great lowlands of the Amazon? Examine the map opposite page 156. 3. Are the cattle raised entirely on the lowlands in this part of South America?

4. From what ports are the hides shipped? 5. Where do the animals live that furnish the wool exported from the western seaports? 6. What animals furnish the wool? 7. What is exported from the rich lowland of Ecuador?

8. Make a list of the mineral resources found in the high, rugged mountains of the Andes. 9. To what parts of the world are these minerals sent? 10. What is the shortest route from the western ports to New York or London?

11. What cities export large quantities of coffee? 12. Where is this coffee sent? 13. What great natural resource, which is very important to manufacturing and which is abundant in the United States, is almost entirely lacking in the northern part of South America?

14. Why have the people not built a railroad up the valley of the Amazon? 15. Where is cotton raised in South America? 16. Where is it sent to be manufactured? 17. If you thought of going into business in Brazil, what lines of business should you consider?

18. Be sure you know the name and location of each of the chief seaports. Learn to put them on an outline map from memory. 19. What are the chief inland cities in the northern countries? 20. Why are there not more important cities in the lowlands of the interior?

21. What portion of the continent sends fruit to the United States? 22. What would contribute most to the industrial development of South America? 23. Explain why southern Brazil is more progressive than the country along the Amazon.

Home work. 1. Make a list of the chief products, as shown on this map, that are sent to the United States. 2. Make a list of the products sent from the United States to these countries. 3. In the same way, list the products exchanged with Europe.

THE GUIANAS

British, Dutch, and French Guiana are the only possessions of foreign nations on the continent of South America. Taken together these three countries are about as large as Ohio, Indiana, and Illinois.

The coastal region varies from 30 to 50 miles in width and is a low, swampy land; in fact, it is hardly right to call all of it land. It is a succession of deltas, half land and half water. Great forests of mangrove, with courida bushes about their roots, border the shore. These plants can live when their roots are in salt water. They form a natural breakwater protecting the coast and forming a coastal lagoon. Rivers deposit silt in these lagoons, and thus in time new lands are made.

Courtesy of Williams, Brown, and Earle

Fig. 260. This is the market house at Georgetown, the capital of British Guiana. Georgetown is a very busy commercial city, for it is the only port of export and import for the whole colony. Find Georgetown on your map. What disadvantages can you see in its location?

Interior. Farther inland, where the elevation is somewhat greater, there are some grasslands, and at the southern margin there is a small portion of the highland region, with hills and low mountains. In the highland area there are many beautiful gorges, and several of the streams have falls and rapids. Water-power will undoubtedly be used more and more as the country is settled. The falls of the Essequibo are among the greatest in the world. They are 300 feet wide and a little over 700 feet high. Aluminum ore, gold, and other minerals are known to exist in the highlands.

Climate and life. The Guianas are lands of constant summer. Abundant moisture is brought by the northeast trades, and during the months when the sun's rays fall vertically north of the equator these lands have a very hot, rainy season. The rains and the high temperature account for the luxuriant forests and the wonderful growth of all vegetation.

The vegetation is so dense that it covers the trunks and limbs of trees, and even the stones and rocks. Nature does not seem to be satisfied with the soil alone, but uses every possible place for plants. The water surfaces are covered with a thick carpet of beautiful flowers. Here the victoria regia grows, with its gigantic leaves from 5 to 6 feet in diameter. These leaves are spread out on the water like those of the pond lily, and the flower, with its many hundred petals, is nearly 4 feet in circumference. In the forests are found numerous flocks of the scarlet ibis and the white egret. Here also the beautiful flamingo lives.

British colony. British Guiana is the largest and most fully developed of the three countries. There are great sugar plantations here, and tropical fruits are raised in vast quantities. Over 100,000 tons of sugar are produced each year, and most of it is sent to the home country. **Georgetown** is the capital and the most important city (Figs. 260, 261). The streets are wide and clean and have grassplots on either side. The houses are chiefly white, and each stands in a beautiful garden of flowering trees, shrubs, and palms,

SOUTH AMERICA
NORTHERN SECTION
POLITICAL AND ECONOMIC MAP
Scale of statute miles
0 50 100 200 500 750 1000
Scale of kilometers
0 100 300 500 750 1000 1500
Capitals of countries
Capitals of European colonies
Chief seaports
Principal railroads
Navigable rivers
Lowlands
Old, worn-down mountains
Uplands and plateaus
Young, rugged mountains
Longitude West from Greenwich
A Habana
Halifax
CARIBBEAN SEA
ATLANTIC OCEAN
PACIFIC OCEAN
CUBA
HAITI
DOM. REP.
JAMAICA
PUERTO RICO
VIRGIN IS.
BARBADOS (Br.)
TRINIDAD (British)
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
COLOMBIA
VENEZUELA
GUIANA
BRAZIL
ECUADOR
PERU
BOLIVIA
PARAGUAY
ARGENTINA
CHILE
Bogotá
Caracas
Quito
Lima
Callao
La Paz
Sucre
Asunción
Georgetown
Paramaribo
Cayenne
Manáos
Belem (Pará)
Rio de Janeiro
São Paulo
Santos
Pernambuco (Recife)
Bahia (São Salvador)
Fortaleza
Maceió
Natal
Parahyba
Aracajú
Penedo
Ilheos
Belmonte
Porto Seguro
Caravellas
Victoria
Petropolis
Campos
Lencoes
Campinas
Ouro Preto
Bello Horizonte
Theophilo Ottoni
Diamantina
Pirapora
Arassuahy
Januaria
Carinhanha
Formosa
Goyaz
Cuyabá
Matto Grosso
Diamantino
Corumbá
Santa Cruz
Santiago de Chiquitos
Trinidad
Larangeiras
Villa Bella
Riberalta
Porto Velho
Labrea
Tabatinga
Iquitos
Teffé
Barcellos
Moura
Santarem
Maués
Itaituba
Borba
Obidos
Almeirim
Mouths of the Amazon
Pará
Bragança
Belem (Pará)
São Luiz (Maranhão)
Parnahyba
Fortaleza (Ceará)
Aracaty
Baturite
Therezina
Caxias
Chapada
S. João das Duas Barras
Carolina
Oeiras
Ico
C. St. Roque
Pedro Affonso
Boa Vista
Pesqueira
Garanhuns
Porto Nacional
Barra do Rio Grande
Feira de Sta. Anna
Cachoeira
São Salvador (Bahia)
All Saints Bay
Site of future capital of Brazil
Paracatú
Catalão
Diamantina
Villa Nova de Lima
Mt. Itambe
Rio Grande
Jupia
Itapura Falls
Urubupunga Falls
Porto Murtinho
Pto. Pacheco
Miranda
Corumbá
Xaraes Swamp
Santa Cruz
L. Concepcion Swamp
Cochabamba
Oruro
Potosi
Huanchaca
Tarija
Tupiza
Iquique
Tocopilla
Arica
Tacna
Mollendo
Arequipa
Chala
Pisco
Ica
Cuzco
Ayacucho
Huancavelica
Cerro de Pasco
Huaraz
Huanuco
Pto. Bermudez
Pto. Acre
Tarauaca
Cruzeiro do Sul
Madureira
Porto Velho
Villa Bella
Guajara-Mirim
Riberalta
Labrea
Manáos
Iquitos
Tabatinga
Teffé
Santo Antonio
Yurimaguas
Moyobamba
Chiclayo
Cajamarca
Pacasmayo
Trujillo
Salaverry
Paita
Piura
Pto. Limon
Negritos
Loja
Cuenca
Guayaquil
Portoviejo
Bahia de Caraques
Esmeraldas
Tumaco
Pasto
Ibarra
Popayán
Cali
Palmira
Buenaventura
Neiva
Medellin
Manizales
Bucaramanga
Cucuta
Barquisimeto
Valencia
Maracaibo
Cienaga
Barranquilla
Cartagena
Pto. Colombia
Calamar
Momos
Lorica
Colon
Panama
Puntarenas
Limon
Gulf of Honduras
C. Gracias á Dios
C. San Antonio
C. Catoche
Santiago de Cuba
Windward Passage
Port au Prince
Kingston
Santo Domingo
San Juan
Pto. Cabello
La Guaira
Cumana
Carupano
Maturin
Barcelona
Calabozo
Port of Spain
Tobago I.
Grenada
Margarita
Los Roques
Curaçao (Dutch)
C. Gallinas
Santa Marta
Magdalena R.
Venezuela
G. of Darien
Gulf of Panama
Panama Canal
Cocos I.
Malpelo I.
Gorgona I.
Pta. Reyes
Galapagos Islands
Demerara R.
New Amsterdam
Berbice R.
Corentyn R.
Courantyn R.
Georgetown
Essequibo R.
Mt. Roraima
Tumatumari
Kurraka
Sipuruni R.
Paramaribo
Surinam R.
Maroni R.
Devils Is.
Cayenne
Oyapock R.
Tumuc Humac Mts.
Amapa
Maracá I.
C. North
Trombetas R.
Tapajoz R.
Itaituba
Itamaraca Falls
Ituboca Cataract
Apuhy Falls
Chacorão Falls
São Manoel R.
Xingú R.
Araguaya R.
Tocantins R.
Martius Cataract
Madeira R.
Purus R.
Javary R.
Jurua R.
Iça R.
Japura R.
Negro R.
Rio Branco
Boa Vista
Mt. Roraima
Orinoco R.
Ciudad Bolivar
Delta of the Orinoco
Caura R.
Caroni R.
Apure R.
Meta R.
Guaviare R.
Inirida R.
Vaupés R.
Apoporis R.
Caquetá or Yapurá R.
Putumayo R.
Napo R.
Pastaza R.
Huallaga R.
Ucayali R.
Maranon R.
Amazon

where it furnishes a pleasant contrast to the green of the abundant foliage which almost surrounds it.

Dutch colony. On the lowlands bordering the coast there are several low, parallel ridges which indicate old shore lines. The sea has slowly withdrawn from the

Courtesy of Williams, Brown, and Earle

Fig. 261. The docks at Georgetown are always busy. Workmen constantly come and go, unloading the goods which the foreign ships have brought or loading them with sugar, rice, and other products. British capital and energy are making British Guiana more important every year

land and left a number of long marshes. In the marshy region the people have built dikes, just as they did in their home country, Holland, to keep out the sea. These lands, when drained, have wonderfully rich soils, and great crops of fruit are raised. Far back in the hills there are mineral deposits. Gold has been found and mined, but there is a shortage of labor, and railroads are greatly needed to help develop the natural resources. **Paramaribo** is the chief city of Dutch Guiana and is located on the coast (Fig. 262).

French colony. Most of the people of this colony live on the coastal lowlands. In the south, in the highland portion of the country, there is gold in the stream gravels, and some day placer mining, like that practiced in California and Alaska, may become an important occupation. There is a great shortage of labor, and travel is difficult. The French people have tried the plan of sending to this colony convicts who have long terms to serve in prison, and have arranged to have them work out of doors. There are several thousand such men in French Guiana now, but the amount of work they do is not very great. **Cayenne** is the capital of French Guiana.

Problems and review questions. 1. About how large are these colonies? 2. To whom do they belong? 3. What kind of climate have they? 4. Is the climate favorable to white people? 5. What are the chief occupations of the people? 6. What have they to sell?

VENEZUELA

The name "Venezuela" means *Little Venice*. The country was so named because the houses in the lowlands, like those of Venice, were built on piles. The native people who live along the banks of the streams have their houses built in that way so that they may occupy them even during the rainy season, when the river rises and overflows its banks.

In the southeast the country is hilly, and in the north and northwest there is a portion of the great range of the Andes.

The southern highlands are known to contain gold, copper, iron, and coal, in addition to the large supply of timber. Much of this part has not yet been explored, as there are no convenient means for reaching the region.

The climate. The northeast trades that bring so much rain to the Guianas also bring an abundance of water to Venezuela. The wet season lasts from about the middle of April until September, and the rest of the year is dry. During the dry season there are heavy dews. The temperature is always warm in the lowlands and usually cool in the mountains.

The easterly breeze is a great comfort to the people of Venezuela who live near the coast. Every morning at about four o'clock this breeze begins to come in from the sea. Sometimes it is very strong. It sweeps away the mists that hang over the swamp lands, dries out the vegetation somewhat, and helps to purify the air. At about eleven o'clock it suddenly dies away and there is a very hot period. Almost everybody goes to sleep. Even the leaves cease to move. Not a sound is heard, unless some traveler from a northern country is here, who has not yet learned to keep still during this part of the day. At about two o'clock the birds are again heard in the forest, and the leaves begin to rustle; the

Fig. 262. Paramaribo is the capital and chief port of Dutch Guiana. Its spotless white buildings, clean streets, and many canals remind one of Holland. The population, however, is made up largely of negroes and laborers from the Dutch East Indies, who work on the sugar, rice, and cacao plantations. This is because the hot, moist climate makes it very hard for white people to live here

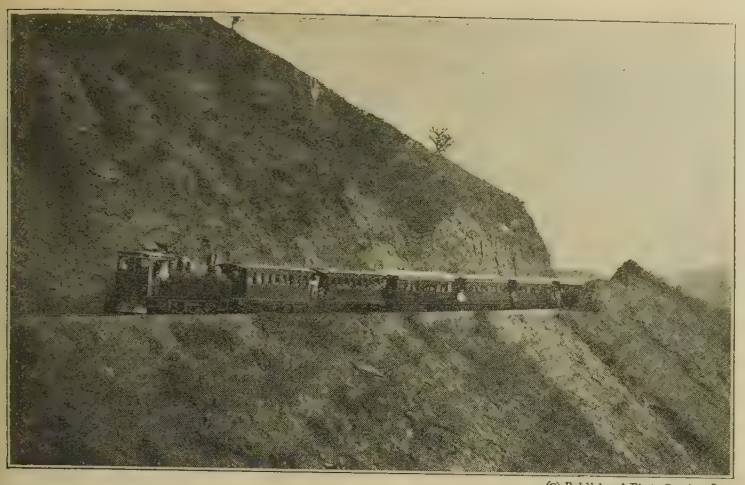

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Fig. 263. The railroad between La Guaira and Caracas has to climb 3000 feet from the port to the capital. The straight distance is only 8 miles, but the railroad zigzags up the slopes of the mountain range, covering 23 miles. A British company constructed this railroad and still owns it

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Fig. 264. The railroad carries the passengers and express freight, but the pack-train donkeys are used to carry the slow freight. Here is a group of them, heavily laden, plodding along the road from La Guaira to Caracas, a distance of 25 miles. Why are the donkeys used for this purpose?

breeze is starting, and it will continue to blow during the rest of the afternoon, and even until sunset.

At **La Guaira**, the chief seaport, the air is moist and very warm, but at **Caracas**, the capital, the climate is cool and pleasant (Fig. 265). The temperature at Caracas seldom rises above 85 degrees or falls below 60 degrees. There is not a stove, nor a fireplace, nor a chimney in the town. The cooking is done in out-of-door ovens.

Occupations. Most of the white people of Venezuela live in the mountain area in the north (Figs. 263, 264). This is because the hot, moist lowlands, like those in the Guianas, are unattractive to white people. Between the ranges in the north, in a broad, valley-like belt from 70 to 100 miles wide, coffee, cacao, and sugar are raised. These products are exported in large quantities to the United States and Europe.

The lowland valley of the Orinoco is an excellent pasture land, on which great herds of cattle graze. The cattle must often be driven long distances to reach points on the river for shipment. Here they may wait for days for a boat. Better shipping conditions are needed in order to make the most of these pastures.

Large steamers go for 260 miles up the Orinoco, and there, at the head of tidewater, is the city of **Ciudad Bolivar**. In certain of the tributaries of the Orinoco vast numbers of turtles live, and each year the natives collect thousands of turtle eggs, from which they extract an oil. The shells of the turtles are often used as dishes in the houses of the natives.

Although the mountains contain coal, iron, copper, silver, gold, and other minerals, as yet there is little mining. Some gold is produced and exported. Along the coasts there are valuable pearl fisheries.

Future. Some day railroads will be built far into the interior of Venezuela, and then it will be possible to bring the cattle and other products more quickly to the seaports. Farming may also become important, and thus this country may be much more prosperous. Some think that Venezuela is more promising than any other country of equal area in South America. As yet there are too few white people in the country, and the Indians and black people are lazy. This country is within such easy reach by water from the United States that many people in North America will probably take part in the development of its natural resources.

Problems and review questions. 1. What winds bring moisture to Venezuela and to the Guianas? 2. Could these winds have helped Columbus to discover America and reach the mouth of the Orinoco? 3. What kind of ships did he have? 4. Where do most of the white people of Venezuela live? 5. What do they raise to sell? 6. Of what value are the great Orinoco Lowlands? 7. What does this country need in order to develop its resources? 8. With what disadvantages must the people contend?

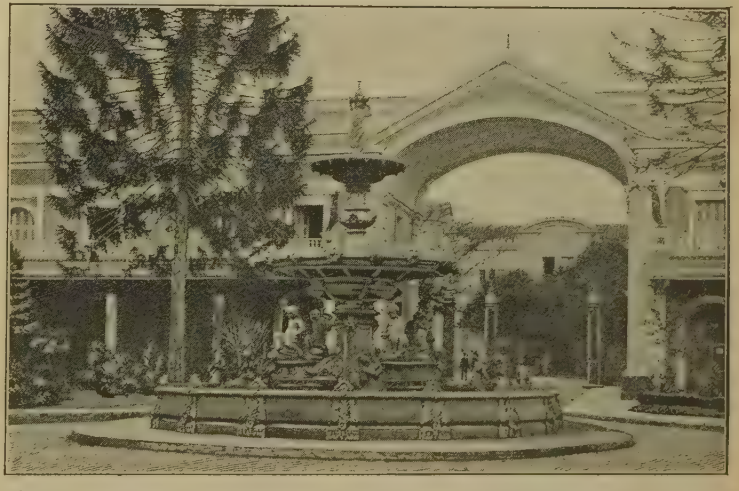

Fig. 265. This is the patio, or open court, of the capitol at Caracas. The capitol is a large building, divided by the patio into two parts. One part is occupied by the president, and the other is used for the meetings and business of the legislature

COLOMBIA

Colombia is fortunate in having an Atlantic and a Pacific coast line. It is one of the countries that should be greatly benefited by the opening of the Panama Canal.

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Fig. 266. Colombia has very few railroads, and the Magdalena River is the great commercial highway through the country. The flat-bottomed boats which are used on the river burn wood for fuel and are propelled by a great stern wheel. Whenever they need wood, they load it from one of the many wood stations along the river

Vessels may now easily reach either shore or go from Colombian ports directly to other Atlantic or Pacific ports.

Natural regions. On the coastal lowlands in the north there are dense jungles. In places these have been cleared for plantations of sugar cane and cacao. Farther south along the western portion of the country are the mountains and plateaus, where the climate is cool and delightful. Nearly all the cities and towns are located in the higher part, and most of the people live and work there. The eastern slopes of the Andes and the great eastern lowland area of Colombia are as yet little known.

To reach the plateau district among the mountains one must sail up the Magdalena River (Fig. 266). Rapids prevent the boats from going more than 600 miles, so after four or five days' travel one must change and go by rail around the rapids, and then return to the river in order to go farther into the interior.

Cities. A railroad climbs to the plateau where **Bogotá**, the capital of Colombia, is located. This city is between 8000 and 9000 feet above sea level, and, like many other South American cities, is built in a fashion similar to those of Spain. The houses stand on either side of the narrow streets. They have no front yards, but are built around private gardens, or patios, which are hidden from the street. The walls of the houses are so thick that they keep out the sun's heat, and most of the buildings are only one story high.

Puerto Colombia (the port for **Barranquilla**) and **Santa Marta** are the chief seaports on the Caribbean Sea, and **Buenaventura** is the chief Pacific port.

Resources. Colombia is a land which produces coffee, gold, silver, bananas, and hides. A great deal of platinum is also mined for export; in fact, Colombia is one of the two leading platinum-producing countries in the world (Fig. 267). More emeralds are found in the mountains of Colombia than in any other country.

The forests on the east slopes of the Andes contain thousands of rubber trees and undoubtedly many other valuable trees.

Future. The rich soils, the mineral resources (which as yet have been little developed), and the forests, all point to this country as another region where progress will be rapid as soon as more railroads and more capital are provided.

Problems and review questions. 1. What are the chief exports from Colombia? 2. In what part of the country do most of the people live? 3. Is this a warm or a cold country? 4. What does this country chiefly need in order to make possible greater development? 5. Where is the capital? 6. How is the capital reached? 7. How may the Panama Canal benefit Colombia?

ECUADOR

Land of the equator. This is a small country on the equator, famous for its panama hats, for its cacao, and for the vegetable ivory from which most of our buttons are made. It is a land of volcanoes and has almost every variety of climate.

Natural regions. Ecuador is easily divided into three parts: (1) the Pacific slope, where there is some flat land and a coastal range of old, worn-down mountains; (2) the high mountains and plateaus; and (3) the eastern slope, where some of the headwaters of the Amazon rise. The eastern slope passes into the great Amazon Lowlands and is covered with a dense forest growth. The

Courtesy of the Pan American Union

Fig. 267. This is a new platinum-mining town near the Pacific coast of Colombia. Here the platinum grains are washed out of the sands brought down from the mountains by the rivers. What other mineral resources has Colombia? In what countries does Colombia find a market for its mineral products?

western slope also has forests, and it is an excellent grazing country for cattle (Fig. 268).

Climate. If we were in Ecuador and at sea level, we should find it very hot all the time and with enough rain for agriculture. If we went up to an elevation of one mile above sea level, the temperature and vegetation would change as much as if we traveled 1500 miles north or south. If we climbed to a height of two miles, the change in temperature and vegetation would be about the same as if we traveled 2500 miles north or south. If we climbed from sea level to the tops of the highest

Courtesy of the Pan American Union

Fig. 268. Here is one of the comfortable estancias, or ranch homes, in the lowland region north of Guayaquil. The head of the family raises cattle, and all, even the women and children, ride about the country on horseback. Why can the products of every climate in the world be grown somewhere in Ecuador?

mountains in Ecuador, it would be somewhat like traveling from the torrid to a frigid zone. The different altitudes explain the variety in climate and vegetation.

Resources. On the Pacific Lowlands there are rich soils, and wonderful crops of sugar and cacao beans are raised. The toquilla plant grows here and furnishes the straw used in the manufacture of panama hats. Here also grows the plant that yields the vegetable ivory (Fig. 269). The native people make great use of the century plant. The broad leaves are used for paper and for thatching huts. The sirup obtained from the leaves is used in making soap. The fibers of the leaves and the roots are woven into sandals and sacks, and the sharp spines are used for needles. In the mountains there are mineral resources yet to be developed.

Cities. **Guayaquil** is the only seaport of Ecuador. The people in this city have recently learned a wonderful lesson in sanitation from the work that was done in the Panama Canal Zone. They have cleared away old buildings, put in sewers, paved their streets, and exterminated many of the insect pests, thus making their city much more healthful.

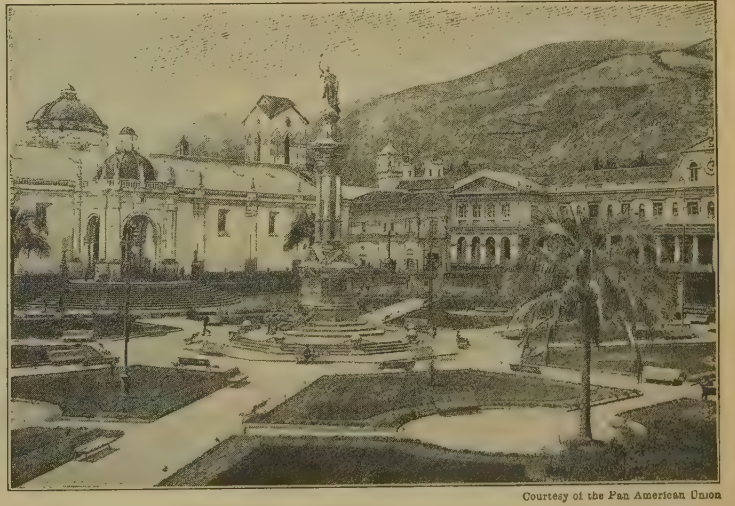
From Guayaquil there is a railroad into the plateau district. At 9000 feet above sea level and almost at the equator is **Quito**, the capital of Ecuador (Fig. 270).

Courtesy of the Pan American Union

Fig. 269. The tagua palm, which grows abundantly in Ecuador, has nuts so hard and white that they are commonly called ivory nuts. Ecuador exports millions of pounds of them every year, to be made into buttons. This view shows the great round burrs in which the nuts are inclosed

Future. Ecuador has been slow to develop its resources. We may expect mining to be increased, railroads to be constructed, the rubber trees in the forests of the eastern slope to be tapped, and many more plantations to be established in the narrow plateau belt between the lofty ranges of the Andes. The climate, especially on the lowlands, is not favorable to hard work, and as yet there are too few white people in Ecuador to make it progressive.

Problems and review questions. 1. State five interesting and important facts about Ecuador. 2. How can you explain the backwardness of the country? 3. What is the capital? 4. What is the one seaport? 5. What portion of the country is most attractive to white people? 6. Explain the presence of glaciers in Ecuador. 7. What are the chief exports? the chief imports? 8. What is the meaning of the Spanish word *ecuador*?



Courtesy of the Pan American Union

Fig. 270. This is the main plaza, or square, in Quito, the capital of Ecuador. Around it are grouped the public buildings, of typical South American architecture. Quito is nearer the equator than any other national capital, yet it has a delightfully temperate climate. Can you explain this?

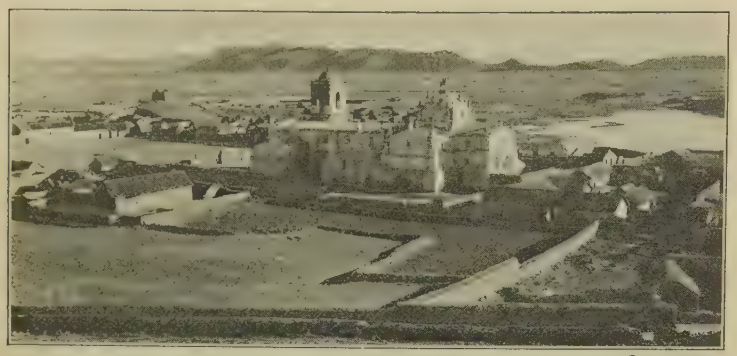


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Fig. 271. This is one of the plateau towns of southern Peru, situated on the high, level land between the mountains. The land is used for raising grain, and this view shows the mud walls, often five or six feet high, which separate the fields. Can you explain the climate here?

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Fig. 272. Paita has a fine sheltered harbor and is one of the ports at which steamers from Panama call on their way down the South American coast. The houses of Paita are made of split bamboo, sometimes covered with plaster. Why is this material used? Locate Paita on your map

PERU

Much of our interest in Peru comes from the stories of Spanish explorers, or from the history of the wonderful Inca civilization. The Incas were the rulers of the native Indian people who lived in the high plateau portions of Peru and Bolivia when the Spaniards first visited these countries (Figs. 274, 276).

When the Spaniards came to Peru, they found that the Inca people had vast quantities of gold and silver which were used to ornament their temples and public buildings. This led the invaders, who had a great advantage because of their firearms, to conquer the Incas and take the treasures of gold and silver back to Spain. For many years the Spanish people controlled this country, but in 1821, at about the same time that Venezuela, Colombia, Ecuador, and Bolivia secured their freedom, the Peruvians also obtained independence and founded a republic.

The natural regions of Peru are (1) a desert strip along the coast; (2) a high plateau with lofty mountain ranges, known to the natives as the sierra (Fig. 271); and (3) the eastern slope and lowland, known as the *montaña*. Peru is in the earthquake belt, and all the houses are built low and very strong, so that they may not be shaken down. When young, rugged mountains grow, little but sudden slips of a few inches, or at most a few feet, take place along great cracks, or fissures, in the earth, and these movements shake the earth.

The dry coastal belt is on the leeward side of the high mountains. After the southeast trades have crossed the Andes, they begin their descent toward the Pacific Ocean. Such winds become warmer and collect moisture instead of giving it up, so the long western seacoast of Peru is a desert. The rainfall in a year is usually less than five inches. In some places rain comes only about once in seven years. *See map opposite page 156.* Narrow strips of the coastal lowland are watered by streams from the mountains, and near these streams there are settlements where irrigation is practiced (Fig. 273).

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Fig. 273. These are Indian workers planting sugar cane in one of the irrigated valleys of the coastal region of Peru. How is the water obtained for irrigation in this arid region?

Cities in the coastal belt. **Callao** and **Mollendo** are the chief seaports of Peru. *See map on page 135.* Callao is the port for Lima, for the central portion of the coastal belt, and for much of the plateau country. Mollendo serves the southern portion of the Peruvian plateau and the plateau of Bolivia. Both of these ports are connected by rail with the high lands of the interior. **Paita** (Fig. 272) is the city from which the petroleum of northern Peru is exported.

Inland, but still on the Pacific slope, is **Lima**, the capital of Peru; it is located on a river and has a good supply of water. In colonial days this city was the center of Spanish authority in South America and was the home of many wealthy and well-educated people.

Arequipa, the second city of Peru, is 6000 feet above sea level, and therefore has a cool climate. Like Lima, it is situated on the banks of a small mountain stream which provides power for a number of cotton and flour mills and a few chocolate factories. They are smaller than the mills and factories in the United States, but have modern machinery. On Mount Misti, near Arequipa, is located a famous astronomical observatory.

The ascent to the plateau. The railroad that runs from Lima to the plateau is one of the highest in the world. When it reaches the great western range of the Andes, it climbs to an elevation of 16,000 feet and then passes through to the other side in a tunnel. Most people cannot go quickly to such great altitudes without becoming sick. The higher air is thinner than the air near sea level, so each breath taken in has less oxygen than a breath taken at a low altitude. To avoid sickness and fainting, passengers are supplied with tanks of pure oxygen, from which they breathe in the oxygen through rubber tubes.

The mountain and plateau region. Most of the people of Peru are in the high mountain and plateau region (Fig. 271). There, where the Incas led their strange and marvelous life, the Peruvians of to-day have made their greatest progress. Mining has been developed on a large scale in the plateau region. Copper, silver, tin, and gold have been found, and there is coal near by. To-day copper is the most important of the mineral products of Peru (Fig. 275). **Cerro de Pasco,** at an elevation of over 14,000 feet, is one of the greatest mining camps in the world.

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Fig. 274. This old water-carrier of Cuzco is a descendant of the great Indian race which, under the Incas, controlled all Peru before the Spanish conquest

Cuzco was once a large city. It is located in one of the high valleys in the plateau, and was the chief city of the Incas. They obtained gold from the mines and stream gravels of the region, but there is much less gold-mining there now.

Grazing. In the plateau region grazing is next to mining in importance. The chief domestic animals are the llamas and the alpacas, which wander about on the plateau and on the mountain slopes to the east and west. The owners of the flocks have great estates that are called *haciendas*. The native people serve as herders and laborers for the owners of the large estates.

The llama (Fig. 279) is really a species of camel, and stands about 4 feet 6 or 8 inches high. The males are trained to carry burdens. They will carry about 100 pounds, but if more is put on their backs they will lie down, and no power on earth will move them until the extra load is taken off. They travel from 10 to 12 miles a day. They must be allowed to feed before night comes, because they will not graze when it is dark. They always walk slowly, gazing on every side and holding their long necks arched. The Indian masters become very fond of them and treat them kindly. Their hair is used to make cloth.

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Fig. 275. This is a great copper-smelting plant on the high plateau of Peru. It is 14,000 feet above sea level and is reached by a railway from the coast. Where is the copper sent from here? What other metal ores are found in Peru? Why is copper the most important?

The llama is often spoken of as the most useful animal in South America. It is to the native what the reindeer is to the Eskimo, the camel to the inhabitants of great deserts, and the yak to the people of the high plateau of Tibet. The alpaca and the llama are both domesticated forms of the wild guanaco. Here in South America the guanaco lives in the high mountains and among the foothills east of the southern Andes, and is hunted as wild game, but the alpaca and llama live with the people just as our sheep and cattle do. This is a very surprising fact, for most of our domesticated animals are descended from wild breeds that disappeared long ago.

The alpaca is smaller than the llama, standing a little over 3 feet high. The fleece of the alpaca is white or black, and it is beautiful, soft, and very long.

Another wool-bearing animal of Peru is the vicuña. This animal, like the llama, alpaca, and guanaco, belongs to the camel family. The vicuña runs wild at high altitudes; in fact, it is not found below an elevation of 13,000 feet. In its habits the vicuña resembles the wild guanaco. It is small and fleet-footed and lives in herds. Because the vicuña lives so high up in the mountains, it has not been domesticated, and for this reason the supply of wool obtained from this animal is scanty.

Home work. 1. Look up the history of the Incas. 2. Read and report about the llamas, alpacas, vicuñas, and guanacos.

Fig. 276. This is part of an old Inca palace on Titicaca Island. It was built nearly a thousand years ago by the first Inca. The huge stone blocks were hewn and set without any machinery, and they fit so exactly that it is hardly possible to get a knife blade between them

Fig. 277. These boys are poling their balsas on Lake Titicaca. The boats are made of rush straw plaited and tied together, and are often fitted with straw sails. Before the steamer line was established on the lake, all transportation was by balsa. Why are the boats not made of wood?

The eastern slope of the Andes. This region of Peru consists of the lower slopes and foothills on the eastern side of the Andes. Here the rainfall is very heavy, and there is a dense tropical forest like that near the Amazon River in Brazil. The forest is wonderfully rich in rubber and hard woods. Rubber is being exported from **Iquitos**, which is nearly 3000 miles from the mouth of the Amazon and at the head of navigation for ocean-going vessels. Wild native people live in the forests, but the few whites who live in eastern Peru stay near the towns which are located on the banks of the rivers.

Future. Peru has been much more prosperous in the past than it is to-day. In 1884, as the result of an unfortunate war, Peru lost to Chile the southern part of her country, where there were rich deposits of nitrate. In that transfer Peru lost the greatest source of her prosperity. There remained, however, the rich metal ores of the high plateau region, which have always been mined extensively. Peru will undoubtedly continue to be an important mining district. Grazing may be still further developed, and the great forests of the eastern slope should some day be of much greater value to the people than they are to-day.

Problems and review questions. 1. What are the three natural regions of Peru? 2. What are the rainfall conditions in each region? *See map on page 156.* 3. Explain the scanty rainfall in the coastal belt. 4. Where do most of the people live? Why? What do they do? 5. What are the chief products for export? 6. What do the Peruvians import? 7. From what countries do the imports come? 8. Why is Peru not a manufacturing country? 9. Name the capital and chief seaports. 10. What route should you follow from New York to Callao? to Iquitos? 11. How should you travel from Lima to Rio de Janeiro? 12. What kind of business might take you to Cerro de Pasco? 13. Why might you like to visit Cuzco? 14. Of what value is the llama to the Peruvians? 15. Of what value is the alpaca to the Peruvians?

BOLIVIA

About half of Bolivia is a high plateau surrounded by lofty mountains; here Lake Titicaca is located (Figs. 244, 277). The other half of Bolivia is a lowland. *See map on page 135.* The plateau is between 12,000 and 13,000 feet above sea level, and in elevation it is second only to the great plateau of Tibet.

Bolivia is now one of the two countries in South America without any coast line. The coastal portion of Bolivia was taken by Chile after a war in which Chile defeated Bolivia and Peru.

Life in the high plateau. In the mountains great supplies of gold, silver, tin, and copper have been found. Bolivia ranks second in the world in the production of tin, the Straits Settlements, in the region of the Malay Archipelago, being first (Fig. 278). *See Appendix, Plate B.* Most of the tin from Bolivia is shipped by way of the Panama Canal to New Jersey.

The people who live on the plateau use Mollendo in Peru and Antofagasta in Chile for their seaports. These

Fig. 278. The dry, barren highlands of Bolivia are very rich in minerals, and mining is the principal industry. This is one of the tin-mining centers. In late years tin has replaced silver as the chief export of Bolivia. How is the ore taken to the coast? To what countries is it exported?

coast cities are connected by railroads with the largest settlements on the Bolivian Plateau.

In some parts of the high plateau there are small farms where wheat, corn, barley, and potatoes are raised. Irrigation is usually necessary. Many of the people who live on the plateau care for sheep, llamas, alpacas, and goats (Fig. 279).

There is very little wood on the plateau, either for building material or for fuel. The houses are therefore made of stone or mud. The people use out-of-door ovens, where they burn brush, cacti, and moss. They plan to bake once a week. If someone should discover coal in or near Bolivia, it would be a great help to the people.

Eastern lowlands. The larger part of Bolivia lies to the east of the crest of the Andes. This section of the country is a great lowland area which merges with the Amazon Lowlands in the north, and which extends south to the plains of Paraguay and Argentina.

The northern part of this lowland area has developed faster than the southern part. Here are forests of rubber trees and many varieties of tropical hard woods. Besides the forest lands there are great areas of rich agricultural lands. Coffee and cacao are the chief products. This part of Bolivia has access to the Atlantic Ocean by way of the Amazon River. By using the railroad which has been built around the Madeira Falls, connection can be made with the Amazon, and thus cargoes of rubber can be transported down the river to Belem.

The southern part of Bolivia, a region of great rolling plains, has as yet no means of communication with the outside world. Before much progress is possible here, railroads must be built from the river port of Asunción in Paraguay to points in eastern Bolivia, or, better still, direct from Rosario or Buenos Aires in Argentina.

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Fig. 280. This view of La Paz shows its location in a deep pocket between the mountains. In the background is snow-capped Illimani, one of the highest Andean peaks. Locate La Paz on your map. What is the climate here? Why is La Paz better suited to be the capital of Bolivia than Sucre?

Cities. **Potosi** is one of the principal mining centers for both silver and tin. The city is located so high that the air there is always cool, or even cold. **Oruro** is another mining city on the plateau and the terminus of one of the railroads. **Sucre** is the legal capital of Bolivia, but **La Paz**, which has a railroad connection and is an important business center, is used as the seat of government. La Paz is the largest city of Bolivia and is two and one half miles above sea level (Fig. 280).

Future. The future of Bolivia is somewhat uncertain. About half the population is Indian, and native Indians are the only people there who can work at high altitudes. There is a scarcity of labor. The mines might well be further developed, for in mineral resources Bolivia is very wealthy. The lack of a seaport is another great disadvantage, and the lack of railroads to the east is holding back development.

Courtesy of Hiram Bingham

Fig. 279. Grazing is important on the high plateaus of Bolivia and Peru. Here is a flock of young alpacas and, in the center, one white llama. They are grazing on a treeless upland pasture 15,000 feet above the sea. The alpacas are raised for their soft, thick wool, which is used to make the finest woolen fabrics. The male llamas are beasts of burden in this part of South America.

Problems and review questions. 1. Divide Bolivia into two natural regions. 2. Which of these regions has most of the people to-day? 3. What are the chief occupations? 4. What seaports serve Bolivia? 5. Name the largest lake in South America. 6. Why should there be little rainfall on the plateau?

7. With little rain falling on the plateau, how do you account for the large lake there? 8. What would help Bolivia most to increase its population and promote industries? 9. Name the official capital of Bolivia. 10. Where are the government meetings held? 11. Name an important mining city in Bolivia.

CHILE

The "ABC countries" of South America are Argentina, Brazil, and Chile. We have studied Brazil; now we will consider Chile, and next Argentina. Chile is a long, narrow country about 3000 miles from north to south. Estimate its average width. Two states of the size of California could be fitted into its area. Most of the land is mountainous and is in an earthquake belt. At the eastern border are the young and rugged Andes, and on the coast a range of old, worn-down mountains.

Courtesy of Walter S. Tower

Fig. 281. This is a view in the rich nitrate fields of Chile. The nitrate deposits are near the surface of the ground, and so can be mined easily. This view shows the caliche, as the raw material is called, piled up near the railroad waiting to be taken to the refining plant

Between the mountain belts at the north is the Atacama Desert, one of the driest places in the world. It is said that it never rains in this desert, and certainly nothing can grow there. South of the desert, between the mountain ranges, is the central valley of Chile, — a long, narrow strip of very fertile land suitable for farming. *See map on opposite page.*

People. Most Chileans are directly descended from the Spanish people. They all speak Spanish and are proud of their descent from the Castilian race. In Chile there has been but little intermarriage with the native people. This has been a distinct advantage to Chile, for the mingling of Spanish and Indian blood tends to develop an indolent type of people.

MAP STUDIES

1. Which is the great agricultural and grazing country? Where are the products sent? 2. Why is that country so favorable to agriculture and stock-raising? *See maps on and opposite page 156.* 3. What is the chief seaport of Argentina?

4. The central valley of Chile is a very fortunate land. What do the people raise there in such abundance that they can ship some of it to foreign lands? 5. What is the nitrate from northern Chile used for? 6. To what countries is it exported?

7. The southernmost city in the world is on this map. What do the residents have to sell, and what do they get in exchange? 8. Learn the names and locations of all the important seaports.

9. Make a list of the imports of all these cities, and select the three which seem to you the most important to the South American people. 10. What sources of power other than coal could the people of South America search for?

11. Locate the lands where large numbers of sheep graze. 12. Where are oranges abundant? 13. With what does South America supply us in great quantities? (Name from five to ten articles and describe their uses.)

Home work. 1. On your outline map of South America shade or color in the boundaries of the countries south of Brazil and Bolivia. 2. Locate and name the capital of each of the countries you have bounded. 3. Read about Magellan's voyage and report to the class.

Climate. The early Spanish explorers, following southward along the coast in boats which they had built at Panama, were much impressed when they reached latitude 35 degrees south and came into a country where rain was abundant. When they found the fertile region of Chile, they named it the Valley of Paradise, and the city of Valparaiso, the chief seaport of the country, has that meaning in its name.

All the way from 5 degrees south of the equator, near the southern boundary of Ecuador, to 35 degrees south, the western coast of South America is exceedingly dry. Throughout all that belt the prevailing winds are from the southeast, coming from the Atlantic Ocean; and, as was explained in the study of Peru, those winds leave their moisture on the east side of the mountains and tend to dry up the country on the west slope.

Fig. 282. The oficina is the refining plant where the caliche is first crushed and then the nitrate separated from the earthy substances. The refined nitrate is packed in bags and sent by railroad to the port of export. Explain how the climate of northern Chile is important to the nitrate industry

South of 35 degrees the winds come from the west. They bring moisture from the Pacific Ocean, and in crossing over to the east they are forced to give up most of their moisture on the west slope. Thus the southern half of Chile is well watered, and the land

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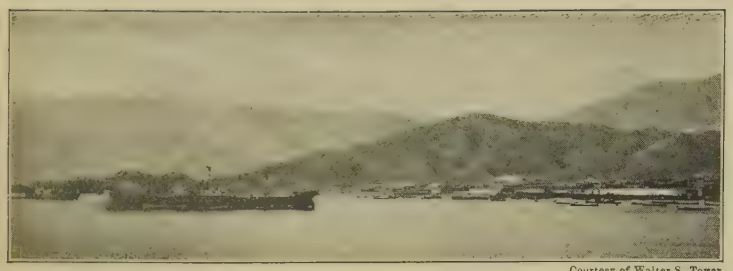

Courtesy of Walter S. Tower

Fig. 283. This is Taltal, one of the nitrate ports of Chile. The coast is rugged, barren, and forbidding, and the nitrate export is the only reason for the location of a city at this point. What are the other nitrate ports? Why is there so large a demand for Chilean nitrate?

east of the mountains in southern Argentina is dry. The dry belt in South America crosses the mountains in central Chile, passing from the west coast to the east. *See maps on and opposite page 156.*

A remarkable resource. The most valuable natural resource of Chile is found in the desert at the north. It is a nitrate of soda which is used in almost all the countries of the world to fertilize soils. This resource has made Chile rich and famous. Railroads have been built into the desert, and hundreds of men are at work producing nitrate for market. Everything they use must be brought in. All the building material for their houses and the mining plants, all the food, and all the water are brought from a distance. Sometimes the water must be brought more than a hundred miles to supply the men and horses and to use at the nitrate works.

The nitrate is found in the earth. Great lumps of this mineral are dug out of the ground and placed in tanks of hot water (Figs. 281, 282). The nitrate is dissolved, and later the water, with the nitrate in it, is allowed to cool, and the pure nitrate comes out. It looks a good deal like coarse salt. It is then put into bags and sent off to one of the seaports to be loaded on vessels and taken to various parts of the world (Fig. 283).

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Fig. 284. The man at the plow is a Chilean farmer of the central valley. He makes a good living on his little farm, and provides a comfortable home for his wife and children. What products does he raise? In what months of the year are his planting and harvesting seasons?

Now that we understand that water will dissolve the nitrate of soda, we can understand why the Chilean people do not want it to rain in the Atacama Desert. If rain fell abundantly, the water would sink into the ground, dissolve this valuable mineral, and little by little take it away to the ocean. It is because of the exceedingly dry condition of the soil that these deposits have been left here.

Courtesy of the Pan American Union

Fig. 285. This is a small seaport town south of Valparaiso. The farmers of the surrounding agricultural country bring their products into town on the backs of sturdy little donkeys

Almost all the world's supply of nitrate is produced in the Atacama Desert of northern Chile. The government places a heavy tax on all of the product that is sent out of the country. Because of these export taxes the Chilean people have very few other taxes to pay.

In addition to the great natural resource of nitrate of soda the Chilean people have discovered large deposits of copper; they have also extensive forests and some rich soils in the valley belt. Nitrate mining is, however, the chief occupation.

Life in the central valley of Chile. The central valley of Chile is from 600 to 700 miles long, and is very much like the rich valley of California. Here the people have made a good start at farming (Fig. 284). Many tropical fruits and some sugar cane, cotton, and rice are raised, and this valley is becoming famous for its vines and the wines that are made from the grapes. Wheat and corn are also raised here. The forests yield timber, and lumber is an important product of export.

Cities. **Santiago,** the capital of Chile, is situated 1800 feet above sea level. It is a very attractive city with a delightful climate, beautiful parks, and a rapidly growing industrial life. In Santiago, as in other South American cities, almost no chimneys are seen, but because of its high elevation more and more of the people are having heating plants put into their homes.

There are no good harbors on the Chilean coast, but at very great expense improvements are being made offshore at **Valparaiso,** so that vessels may anchor and unload cargoes into small boats (Fig. 287).

The journey from Valparaiso to New York, a distance of about 4600 miles by way of the Panama Canal, now takes two weeks. The route is very near to a north-and-south line. The distance from Valparaiso eastward across the Andes to Buenos Aires, the capital of Argentina, is 900 miles. The journey was formerly a very difficult one, and rather than cross the high mountains most travelers went around Cape Horn or through the Strait of Magellan. To-day there is a railroad connecting the two cities, with excellent modern equipment for the passenger trains.

Punta Arenas, a Chilean port on the Strait of Magellan, and the southernmost city in the world, ships wool, hides, whale oil, and furs to Europe and the United States. It is a coaling station, and has shops where repairs may be made for steam vessels.

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Fig. 286. This is the "Christ of the Andes," the great statue erected on the boundary line between Argentina and Chile as a pledge of everlasting peace between the two nations

Summary. The present prosperous condition of Chile is largely due to its one great natural resource from the Desert of Atacama. This one resource affords employment for a large number of people in Chile. Some of them are engaged in mining the nitrate, others in preparing it for market, and still others serve as carriers and take provisions and water to the workers in the mines.

Chile is mining and exporting the nitrate at an extravagant rate. Although it has been estimated that the present supply is sufficient to last from thirty to one hundred years longer, the day will come when the nitrate deposits will be exhausted. Then Chile must depend upon other resources for its prosperity.

Because Chile extends so far north and south, it is a land of many and varied resources. In the Central Valley farming has already been well established, and the value of the agricultural products is increasing each year. Many cattle, sheep, and goats graze on the fertile grasslands, and the people who are not engaged in tilling the soil are occupied in stock-raising. One of the greatest future resources of southern Chile lies in the rich forest lands which have as yet been little used. The discovery of coal and the presence of water-power may lead to the development of manufacturing. If that happens, Chile may become, like the New England region, an industrial district, and her manufactured goods may be sold in Argentina, a great agricultural country, or in Peru, a great mining country.

Courtesy of the Pan American Union

Fig. 287. The harbor of Valparaiso is open to the north and west, and heavy gales often make anchorage very dangerous. Therefore the government is planning to build a great breakwater and to improve the harbor in other ways. What are the exports and imports of Valparaiso? With what countries does Chile trade most?

Problems and review questions. 1. What are the chief occupations of the Chilean people? 2. What is their chief seaport? their capital? 3. Why is the northern part of the coast dry and the southern part wet? 4. Explain why the Chilean people do not want it to rain in the Atacama Desert.

5. Why should they develop farming and manufacturing? 6. What advantages has Chile for promoting manufacturing industries? 7. Where could Chile expect to sell manufactured goods? 8. Describe the routes of travel from Valparaiso to Buenos Aires; from Valparaiso to New York.

9. Why was Valparaiso so named? 10. Describe the process of nitrate mining. 11. Why does Chile put a tax on all its nitrate exports? 12. What other mineral is found in Chile? 13. What effect has the Panama Canal had on the trade of this country?

Fig. 288. This is the main plaza of Santiago, laid out by the founder of the city in 1543. Santiago is situated in a beautiful valley where semi-tropical plants and trees grow in great abundance. East of the city rises the snow-capped wall of the Andes, separating Chile from Argentina

Courtesy of Walter S. Tower

Fig. 289. The Argentine Pampa is a vast, unbroken expanse of level plain, covered, except in the cultivated parts, with long, luxuriant prairie grass. There are no trees, and one can travel a thousand miles without finding a single natural variation of the monotonous flatness. The Pampa has long been a great grazing area. This is a typical herd of Argentine cattle on the Pampa. They are splendid specimens, and the breed is being constantly improved by the importation of foreign stock. The Pampa is nearly as large as England and France combined, yet it forms only about one fourth of Argentina

ARGENTINA

Argentina is the second largest country in South America and has the second largest population. It is a vast, rich land which offers great opportunities.

Natural advantages. Turn to the maps on pages 145 and 156 and notice the natural advantages of Argentina. (1) Most of the Paraná Lowlands belong to Argentina. (2) Over much of the country there is enough rainfall for grazing and farming. If the rainfall were notably heavy, there would be a dense forest; if there were much less rainfall, the lowland would be a semidesert like the region farther south. (3) This country is in the temperate zone, so it is not too cold or too warm for white people. (4) There are good harbors in the estuary of the Plata River and farther south at Bahia Blanca. (5) There are great navigable rivers in the northern portion, and in certain of the rivers there are opportunities for developing water-power. (6) Gold, silver, copper, and iron have been found in the plateau portion at the northwest. (7) The levelness of the land surface makes railroad building easy.

Occupations and products. These great natural advantages have given the country a wonderful start. Argentina is one of the great producers of cattle, horses, and sheep (Fig. 289). Wheat and corn are produced in great quantities (Figs. 297, 299).

In the northern and northwestern parts of Argentina there are forested areas which are being developed more and more. Lumbering has become an important industry. Many of the woods are extremely hard, and one is known as quebracho, which means *ax-breaker* (Fig. 290). The wood of the quebracho is so heavy that it will not float. Besides being valuable for timber the tree has been found to yield tannin, which is used in making leather.

In the plateau region at the northwest the life is quite different from that in the lowland region. There the people are interested in mining. Formerly the ores were sent on the backs of mules over the high mountains and across the desert of Chile to the Pacific coast. Now there is a railway into the district, by which most of the metals are taken to Rosario for shipment to other countries.

Courtesy of Walter S. Tower

Fig. 290. These cars are loaded with logs of the quebracho tree, which grows in northern Argentina. Quebracho is a very hard wood, useful for cabinet-making, railroad ties, and paving blocks. The quebrachos are being cut so fast that laws must soon be made to conserve the supply

Courtesy of Walter S. Tower

Fig. 291. This is a little village in arid San Juan Province, where the people earn their living by gathering the woody roots of drought-resisting bushes, which they dig out of the ground. The sticks in the foreground will be used to make charcoal or sold to the railroads for fuel

Near the mines many people are engaged in raising vegetables and fruits for the use of the mining population. Peaches, figs, pears, grapes, and oranges are produced. Some wheat also is raised here, but not in such large fields as in the lowlands.

El Gran Chaco. West of the Paraguay River and extending through a part of northern Argentina, across western Paraguay, and into Bolivia there is a vast area called El Gran Chaco, of which little is known. Indian tribes live there, and a few of the rivers have been explored. Railroads have been planned to cross it. At the western margin, where there are streams from the mountains, some agriculture has been started. In places cattle are raised (Fig. 293), and from the forests in the south

Courtesy of Walter S. Tower

Fig. 292. This is a typical town of northwestern Argentina, barricaded on the west by the barren ridges of the Andes, and open on the east to the great Argentine plain. The days are always sunny here, and irrigation is needed for agriculture. Why is there little or no rain?

quebracho wood and tannin are secured in large quantities. The quebracho wood and tannin exported each year are worth more than ten million dollars. Over 4000 men are now engaged by one company in this business.

The Pampa. The greatest single natural resource of this country is the extensive lowland area of rich soils called the Pampa, west and southwest of Buenos Aires.

The term "pampa" comes from the Indian language, and means any flat country, whether it is high or low, dry or wet; but the term "the Pampa" seems most appropriately applied to the great rich lowland country of Argentina, stretching from the Salado River on the north to the Negro River on the south, and from the Paraná and Paraguay rivers to the base of the Andes Mountains.

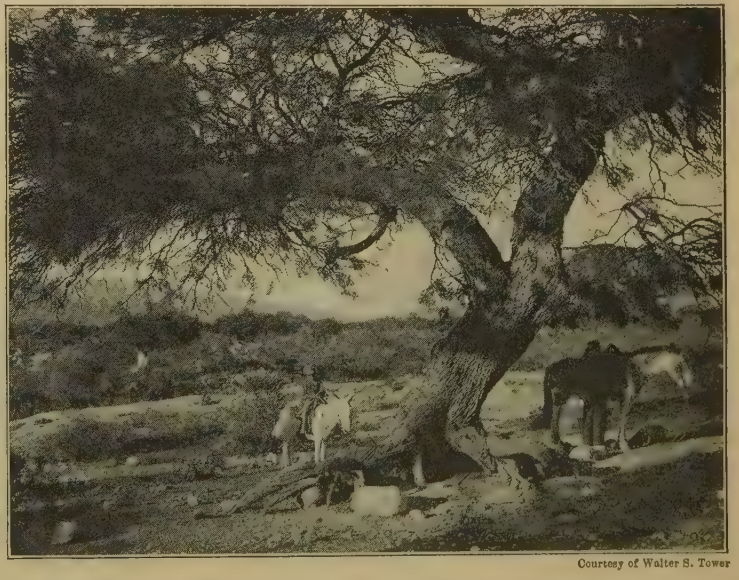
The Pampa is one of the most remarkably flat places in the world. The soils of which it is composed were washed from the mountains into an interior sea by rivers, and spread out eastward in the form of delta deposits. Little by little the sea disappeared, leaving the broad delta plains exposed as dry land.

The Pampa is the wonderful wheat land of South America, and the land where millions of sheep and cattle roam as they feed on the tall, waving grasses of

Courtesy of Walter S. Tower

Fig. 293. These men are herdsmen of the Argentine Chaco. They wear enormous stiffened leather guards to protect them from the dense undergrowth as they ride through the forests. How does the plain of the Chaco differ from the plain of the Pampa? Do the Pampa herdsmen have to wear leather guards?

the fertile plains. There are railroads which run in perfectly straight lines for miles and miles across the Pampa. In many parts no bridges, no tunnels, no rock-cutting or filling were necessary in constructing the railroads. Over broad areas there are no hills or elevations of any kind as far as the eye can reach (Figs. 289, 295). The largest objects seen may be a few trees around some ranchman's home, or possibly a windmill, which is the common sign of one of the better homes in the country. With these exceptions the horizon is unbroken.



Courtesy of Walter S. Tower

Fig. 294. The west central part of Argentina is a semidesert country, similar to the desert of Arizona. The picture shows the rough, bowlder-strewn ground, the scrubby bush growth, and the twisted locust tree. What do you suppose the boy has in the tin can hung from his saddle?

Courtesy of Walter S. Tower

Fig. 295. This great steam plow is breaking rich, new soil on a part of the Pampa which has never been cultivated before. The levelness, the fertility of the soil, and a sufficient rainfall make the Pampa a great agricultural region. What are the important crops?

Life on the Pampa. The Pampa is a land where everybody learns to ride horseback. The ranchmen go on horseback to visit the men who care for the great herds of cattle or flocks of sheep, and the children soon learn to ride the swiftest of horses.

The weather at times becomes very warm; and if rain fails to come, as it sometimes does, the farmers lose their crops. This is especially true through the western portion of the lowland; here conditions are similar to those in western Kansas, Nebraska, or Oklahoma, where there are occasional dry seasons that make the farmers very unhappy. In any country, people who have their farms at the margin of the well-watered land and near poorly watered land must count on losing a crop every few years because of a dry season or because of drying winds.

Unfortunately there are portions of this lowland region where the miserable little ticks, fleas, and mosquitoes are so numerous that life is unendurable. Dragon flies, which feed on mosquitoes, have been seen flying in clouds from 10 to 12 feet thick, so that they even darken the sky. There is another very serious pest which the farmers on the Pampa dread, and that is the locust. As they pass over the country they eat the corn and wheat, and sometimes an entire crop is destroyed in twenty-four hours. Such great migrations of the locust do not come every year, and some day scientists will learn how to fight them and perhaps how to exterminate them.

Life in southern Argentina. This part of Argentina was formerly called Patagonia. It was really "no man's land," but in 1881 the southern portion of the continent, including Tierra del Fuego, was divided between Chile and the republic of Argentina. Since then railroads have been built and many people have gone there to live. The climate is dry in summer, but by irrigating the soils it is now possible to raise vegetables and fruits. Grazing is the chief occupation.

Courtesy of Walter S. Tower

Fig. 296. This is a clump of the tall, flowering grass which is known as "Pampa grass," but which grows on the hills and mountain slopes of Argentina

The native Patagonian people are large, strong Indians, who still live in a primitive way. They are great hunters, and as yet they do not use firearms as white men do. Instead, they have *bolas*, which are made of two or three small stones covered with skin and fastened together by strings or rawhide. They become very skillful in throwing these about the legs, neck, or body of an animal and tripping it up. Even birds are sometimes caught in this way just as they are rising from the ground. The Indians kill great numbers of the guanacos

Courtesy of Walter S. Tower

Fig. 297. These wagons are loaded with grain raised on the Pampa, and are on their way to the nearest market or shipping point. Each wagon is drawn by six horses, and some of the traces are attached to the hubs of the wheels. Compare the size of the wheels with the horses. These high-wheeled carts are typical of all South America and are well adapted for traveling over the muddy roads which are so common in the regions of abundant rain. What different kinds of grain might these bags contain? During what month is wheat harvested in Argentina? *See Appendix, p. iv*

for food, and use the skins for clothing and bedding. They depend also upon the rhea, or South American ostrich, for food. This bird has short wings and cannot fly well. It counts on running away from its enemies.

Home work. 1. Place the chief seaports of South America on your outline map. 2. Read about the Patagonian Indians in a good reference book. 3. Read about Tierra del Fuego. *See Appendix, page i,* for list of reference books.

Cities. **Buenos Aires,** the capital of the republic, is now the largest city in South America (Fig. 298). About one fifth of the entire population of Argentina live in this city. Like Chicago, Buenos Aires is built on flat land, and most of the streets cross at right angles. There are no hills like those in Rio de Janeiro, and no beautiful islands; and yet, like Chicago, the city has a great water front. Again, like Chicago, Buenos Aires has the advantage of a wonderful system of parks and playgrounds. There are seventy-two parks in Buenos Aires, and they are being improved and enlarged every year.

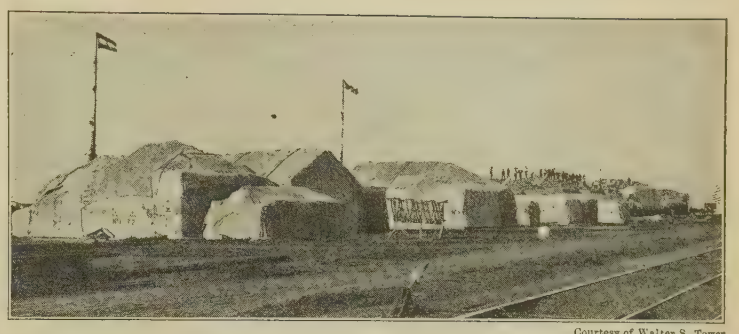
Courtesy of the Pan American Union

Fig. 298. The National Capitol at Buenos Aires is not unlike our own Capitol at Washington in general appearance, but is much more elaborately decorated in the typical South American style

The harbor at Buenos Aires was not satisfactory, and on account of this fact a great deal of dredging has been done to deepen the water. A very excellent system of stone docks extends for miles along the water front. The Plata River is a shallow estuary and not like a real river. The land sank and the sea water came into the mouth of the river, just as it did when Chesapeake Bay was made (Fig. 300).

British and German people have invested large amounts of money in Buenos Aires and throughout Argentina. Many of the storekeepers are foreigners; some are Spanish, others Portuguese, others Italian. Spanish is the language most commonly spoken; Buenos Aires is, in fact, the largest Spanish-speaking city in the world, — larger than any city in Spain.

Rosario, the second largest city in Argentina, now has a good harbor which has been deepened by dredging. There are large stockyards and refrigerating plants located in the city. Before the days of freezing meats cattle were killed chiefly for the hides and tallow. Some of the meat was salted, but most of it was thrown away. Now the meats are frozen and sent to distant ports, chiefly in western Europe. This has meant a great increase



Courtesy of Walter S. Tower

Fig. 299. These canvas-covered stacks contain more than two million bushels of grain waiting to be shipped to Buenos Aires by rail. Why is grain stacked in the open in Argentina instead of being stored in grain elevators? Where will it be sent from Buenos Aires?

in profits for those engaged in raising cattle and sheep. It has increased the value of the lands, caused railroads to be built, and brought many more people to Argentina.

Farther south along the coast is **Bahia Blanca,** and from there railroads extend to different parts of the country. That city has been growing very rapidly, and large quantities of wool and wheat are shipped from there to the United States and Europe every year.

Mendoza is one of the most important inland cities. Here, by means of irrigation, the people have cultivated large vineyards, and a great deal of wine is made. Now that Mendoza has a railroad connection with the Atlantic and Pacific coasts, more of the products of this part of the country are reaching the larger markets of South America.

Córdoba is a thriving city on the western margin of the richest wheat district in Argentina. It is also in the midst of the flax-raising area and has a number of mills where the oil is extracted from the flax seeds.

Tucumán, another inland city, is the center of the Argentine sugar-producing area and has sugar refineries.

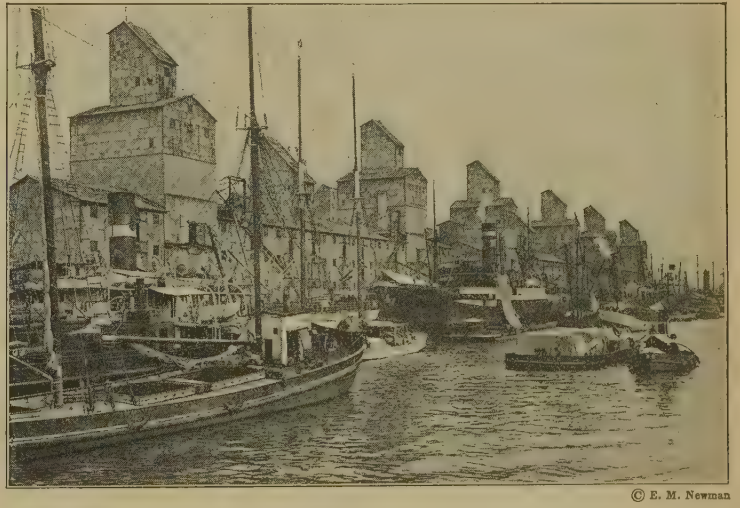


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Fig. 300. The docks at Buenos Aires are lined with elevators in which grain is stored awaiting shipment. The harbor is man-made, and the port one of the best equipped in the world, ranking second among the ports of the two Americas. What is the first port?

Summary. When thinking of Argentina, remember that it is, first, a wonderful farming and grazing country, and that the raising of stock has led to meat-packing, dairying, and the refrigerating of meat for export.

If we visited this country, we should see the farmers using the same kind of implements and machines as are used in the United States; and about their homes and in the pastures we should see windmills that were shipped from the United States. These are indications of the large trade which we are building up with Argentina.

Courtesy of Walter S. Tower

Fig. 301. When the Argentine fishermen return from their fishing trips they have to haul their boats ashore, for there are very few harbors where they can anchor safely. Compare the coast line of Argentina with that of New England. In what way are the New England fishermen better off than the Argentinos?

The notable contrast with the United States is that there is very little industrial life in Argentina. The mechanical arts have not been developed, and it is not likely that Argentina will become a great industrial country. Fuel is scarce and the people are not mechanics. Argentina imports coal. There are flour mills, sugar mills, and some weaving mills, but most of the machinery and manufactured goods that are needed are brought to Argentina in exchange for raw materials.

Argentina is undoubtedly destined to become a great agricultural nation. More and more people will emigrate from the crowded industrial centers of Europe to the farming lands of the Pampa. With the increase of population, the extension of railroads, and the development of more routes of communication with the markets of Europe and North America, Argentina should become one of the richest countries of the world.

Problems and review questions. 1. What are the great natural advantages of Argentina? 2. What are its chief disadvantages? 3. Make a list of the chief exports; the chief imports. 4. What is the largest city in South America?

5. Why is there a great grassland in the Paraná Lowlands and a dense forest in the lowlands of the Amazon? 6. Why is a portion of Argentina a semidesert? 7. From what country do the people import their farming machinery?

8. How did the improvements in refrigerating meats help Argentina? 9. What does the country need? 10. What especially interesting facts about Argentina have you learned from the pictures?

PARAGUAY

Paraguay is a little larger than the state of California, and is one of the two countries in South America without any seacoast. It is an extensive lowland country, a part of the Paraná Lowlands, where most of the land is from 100 to 500 feet above sea level.

The Paraguay River divides this country into two somewhat distinct parts. In the east there are forests, and also large groves of orange trees and many banana trees. The forest is broken here and there by open pasture lands and fields of brilliant flowers. On the west is the Chaco, a land of broad, open fields with here and there quebracho forests. A few palms are scattered about on the plains. In the western part of the country the rivers wind about through such long channels that much of the water is evaporated before the streams reach the Paraguay River. It is a region of little rainfall, but there is enough to nourish a tall grass that serves for pasture.

Courtesy of the Pan American Union

Fig. 302. The forest on both sides of the Paraguay River is rich in valuable quebracho trees, and lumbering is extensively carried on. These lumbermen are resting while they cook their mid-day meal. The quebracho logs are carried down the river in boats, because they are too heavy to float

The Paraná and Paraguay rivers are navigable, and shipments may be made down the river to Rosario, Buenos Aires, and Montevideo. Boats can sail 1300 miles on the Paraguay.

Occupations. The chief occupation is just what would be expected in a grassland region without severely cold weather. It is grazing. Lumbering is important and will increase as the hard woods of the South American forests are used more and more in building (Fig. 302). Many people are interested in extracting tannin from the quebracho tree, and many others are engaged in selling the wood of that tree as lumber.

Paraguay tea is known in Spanish as *yerba maté* (Fig. 304). It was here that the Indians introduced this tea to the Spaniards. The native people and many others in South America prefer the maté to coffee or to the varieties of tea from Japan or Ceylon that are so commonly used in North America and Europe. They drink the maté through a little tube. The tea is held in a cup made of a gourd, and it is the custom of the people to take a little drink of tea every few hours. It is a very common sight to see them stand around with the gourds and the little tubes through which they draw the tea up into their mouths. This tea is now being exported to distant lands. It is for sale in the larger cities of the United States.

Courtesy of the Pan American Union

Fig. 303. This Paraguayan woman is at work making the fine lace for which her country is famous. Where does the thread which she uses come from?

Oranges are so common in Paraguay that a traveler can get a dozen for a cent. Almost every Paraguayan will suck the juice of twenty or thirty oranges a day. The trees grow on the banks of the rivers, in the gorges, near the ranches, far back in the forests, — in fact, almost everywhere in Paraguay. Great carts drawn by three yokes of oxen, each cart carrying about 5000 oranges, are used in bringing the fruit to the banks of the river for shipment to Buenos Aires and Montevideo. The oranges grow in such abundance that it is impossible to use all of them. Thousands are devoured by birds, monkeys, and other animals, and yet each year tons and tons of oranges drop to the ground and rot.

Insect pests. Paraguay is a land where the mosquitoes, fleas, and flies are terrible pests. Scientific methods should be used to kill off these insects, so that life here may be more bearable.

Cities. **Asunción** is the capital of Paraguay. It is reached by boats that come up the river from Rosario and Buenos Aires (Fig. 305).

Villa Rica, the second largest city in Paraguay, is situated on the one important railway in the state. It serves as a collecting center for the agricultural products of southern Paraguay.

Courtesy of the Pan American Union

Fig. 304. These men are Paraguayan maté gatherers. The yerba maté is South American holly, which grows abundantly in Paraguay and southern Brazil. Each day the gatherers pick the leaves and twigs of the maté, bringing it in on their shoulders to the camp, where it will be cured over a fire

Concepción is the third city of importance in Paraguay. It is situated on the Paraguay River at the head of navigation for large river vessels and is therefore a commercial center of some importance.

Future. Paraguay will undoubtedly develop its rich agricultural lands; but before it can really become prosperous, more railways must be built and more white people must come to live in the country.

Problems and review questions. 1. Name the two countries of South America that are without coast lines. 2. How does Paraguay carry on commerce? 3. How would a traveler reach the capital? 4. What two crops are most remarkable? 5. What product from Paraguay is important to the shoe business? 6. How may living conditions be improved in Paraguay? 7. On what does its future progress depend?

Fig. 305. Asunción, the capital of Paraguay, stands at the head of navigation on the Paraná River. Paraguay has no seacoast, and the Paraná is the most important highway into the country. Asunción is therefore an important river port. What products of Paraguay are sent down the river to Buenos Aires for export?

Courtesy of Walter S. Tower

Fig. 306. This is one of the modern steam threshing outfits in use in Uruguay. Although nearly all the land of the republic is suited to agriculture, only about one twentieth of it is under cultivation to-day. What conditions throughout the world will cause Uruguay to change gradually from stock-raising to agriculture?

URUGUAY

This country is a great pasture land. Like much of Argentina, Uruguay is fortunate in its surface features, in the richness of its soils, and in its good harbor and its one large navigable river. The prevailing coast winds are from the southeast, and they bring in an abundance of moisture, so that all of Uruguay is well watered. The climate is mild and healthful. In January, which is the warmest month, the average temperature is about 80° Fahrenheit, and in July, the coldest month of the year, the temperature is commonly about 55°. The lowest temperature that has been observed is not down to the freezing point.

Everything that will grow in temperate or subtropical climates will grow in Uruguay. The grazing of sheep, cattle, and horses is the chief occupation of the people (Figs. 307, 308), but general farming is becoming more and more important (Fig. 306). Large quantities of grain and fruit are raised.

Commerce. The grazing has led to the establishment of certain industries which grow naturally out of the raising of stock. Meat-packing and the refrigerating of meat for shipment occupy the time of a large number of people. Great quantities of beef extract are made for export.

Cities. **Montevideo** is a modern, healthful city with a very pleasant climate (Figs. 309, 310). The name "Montevideo" comes from the hill, or mount, which rises to a height of 505 feet and is the most prominent feature about the city. It can be seen for 12 miles out to sea. There is a lighthouse on the mount, and the revolving light in the top can be seen for 25 miles. The city is built on a point of land between the Atlantic and a large bay.

The people of Uruguay all seem to want to live in Montevideo. The city now has about one third of the entire population of the country. Farmers and ranchmen either have city homes or look forward to having them.

Montevideo is the capital of Uruguay, and from its harbor ships leave with their great cargoes of wool, beef, and hides for ports in the United States and Europe.

The sea breezes pass through the city from one body of water to the other. In the bay there is room for 500 vessels. Opposite Montevideo the Plata estuary is 64 miles wide, and at Buenos Aires, 210 miles farther upstream, it is 34 miles wide. There are numerous shoals and sand bars in the river, so that navigation is difficult.

Occasionally the pampero, or storm wind of the Pampa, sweeps across this estuary of the Plata with great violence and whips the shallow water into a very rough sea. At such times vessels are in great danger of being driven upon sand bars and wrecked.

Future. For its size Uruguay is the most fortunate country in South America. Its location, climate, soils, surface features, and harbor promise a prosperous agricultural life with an ever-increasing commerce.

Problems and review questions. 1. What are the chief occupations of the people? 2. Name and give the location of the capital. 3. What has Uruguay to export? 4. How does the climate of Uruguay affect the occupations? 5. What are the prevailing coast winds? 6. Why is navigation in the Plata River difficult?

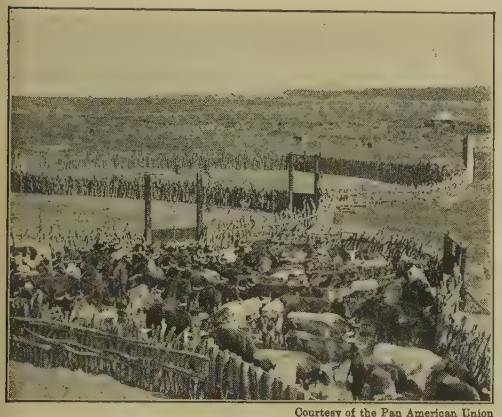
Courtesy of Walter S. Tower

Fig. 307. Most of Uruguay is rolling, grassy country dotted with scattered clumps of trees. The soil, temperature, and rainfall are all favorable to agriculture, but at present more than four fifths of the total area of Uruguay is devoted to grazing. Sheep-raising is the greatest industry, and thousands of flocks like this one graze over the country

FALKLAND ISLANDS

The Falkland Islands belong to the British. They are in a very stormy part of the ocean; no trees grow there, and all the wood which the people use in building their homes or in shipbuilding must be imported. Peat has been found and is used as fuel. Very little agriculture is carried on. A few vegetables are grown, but they are poor in quality. Most of the food must be brought in from other countries.

Sheep-raising is the chief industry, and in spite of the stormy conditions the sheep thrive remarkably. Some cattle are raised; fish are abundant in the waters surrounding the islands, but because of the heavy winds and stormy weather very little fishing is done.



Courtesy of the Pan American Union

Fig. 308. Cattle-raising is second only to sheep-raising in Uruguay. These cattle are herded in a typical corral, which is very roughly but strongly made by using the crooked limbs of trees

These islands have long served as a repair station for sailing vessels that have found difficulty in rounding Cape Horn or in passing through the Strait of Magellan. Now that the Panama Canal is open for traffic, fewer vessels will go this way.

COLON ARCHIPELAGO

(GALAPAGOS ISLANDS)

A group of ten islands, 600 miles west of Ecuador and 850 miles southwest of Panama, have appeared for years on almost all maps as the Galapagos Islands. In 1892 they were officially renamed the Colon Archipelago in honor of Columbus. These islands belong to Ecuador. The Spanish word "galapagos" means *turtles*. When the islands were discovered, there were no people living there, but there were many giant turtles, some large and strong enough to carry a man. Pirates are supposed to have used these islands as a meeting place, and they may have buried stolen treasure there.

PROBLEMS AND GENERAL REVIEW QUESTIONS

1. In what part of South America did Columbus land? 2. Where was the land of the Incas? 3. What languages are most commonly spoken in South America? 4. What is the commonest form of government in South America? 5. What South American countries are colonies of European nations? To what nations do they belong?

Fig. 309. The docks at Montevideo are always busy, for Montevideo is the great port of Uruguay and handles three fourths of the exports and imports of the country. From what countries have the ships in the picture come? What have they brought to Montevideo? What will they carry away?

6. Where is the greatest coffee-producing area? 7. Where are the best grazing lands? 8. What countries produce large quantities of fruit? 9. In what country are oranges most abundant? 10. What is the largest country? 11. Where is the greatest rubber-producing area?

12. What country is famous for its tin? 13. What country is famous for its nitrate? 14. What country is famous for its panama hats? 15. What improvements would be of the greatest help to South America?

16. What country of South America may rival the United States? 17. What country sends us wool? 18. What products do the people living on the lowland plains raise in such abundance that they can export them?

19. What products from the great forests of South America are shipped to other countries? 20. What do the people get from the mountains and sell to other people? 21. What product is raised on the slopes of the Brazilian Highlands and shipped from Santos? Where is it sent? *See map on page 145.*

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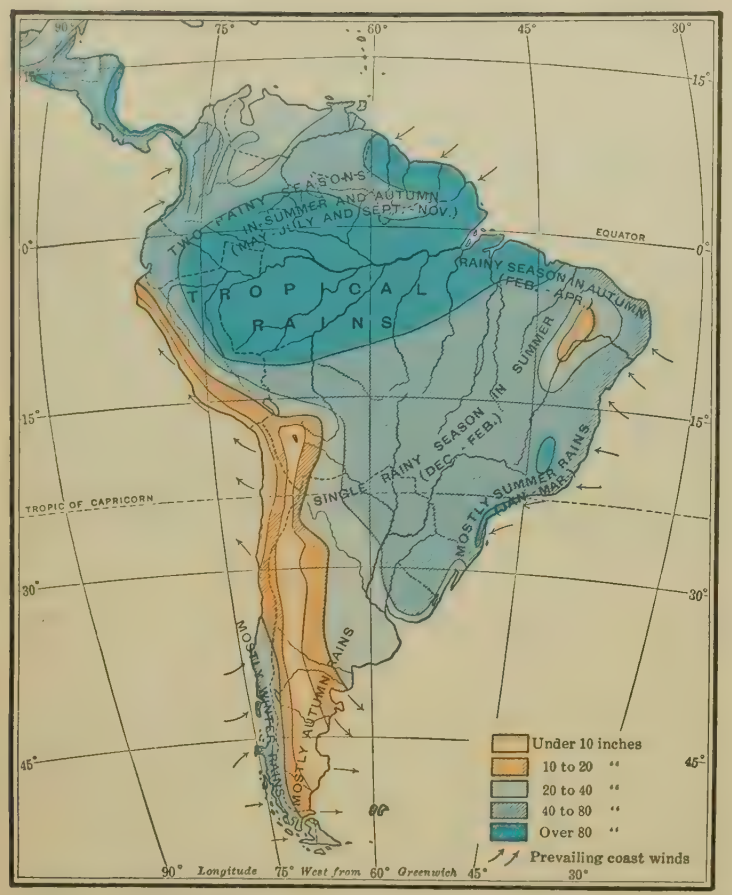
Fig. 310. This is one of the plazas in Montevideo, the capital of Uruguay. Montevideo is the only large city in the republic. Can you account for this? Locate Montevideo on your map. How should you travel from Montevideo to Asunción? to São Paulo? to Santiago?


TWO RAINY SEASONS IN SUMMER AND AUTUMN (MAY - JULY AND SEPT. - NOV.)
TROPICAL RAINS
RAINY SEASON IN AUTUMN (FEB. - APR.)
RAINY SEASON IN SUMMER (DEC. - FEB.)
SINGLE RAINY SEASON IN SUMMER
MOSTLY SUMMER RAINS
MOSTLY AUTUMN RAINS
EQUATOR
TROPIC OF CAPRICORN
Under 10 inches
10 to 20 "
20 to 40 "
40 to 80 "
Over 80 "
Prevailing coast winds
90° Longitude 75° West from 60° Greenwich 45° 30°

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Average annual rainfall in South America

© Ginn and Company

Distribution of people in South America

COMPARATIVE MAP STUDIES

1. Where is the great tropical forest of South America? How much rain falls there each year? Is it a good place for white people to live in? Why? 2. Where is the rainfall more than is favorable to agriculture? What winds bring such heavy rains?

3. Where is the rainfall about right in amount and seasonal distribution for agriculture? Do the people practice agriculture in these parts? 4. Where are the extensive grasslands in South America? How much rain do they receive?

5. To which coast do the southeast trades come? 6. To what coast do the northeast trades come? 7. To what coast do the prevailing westerly winds come? 8. In what months does the rainfall of southern Brazil come? 9. What are the summer months in southern Brazil? 10. Where are the temperate forests in South America?

11. How do you explain the very dry conditions on the west coast from 5 to 35 degrees south latitude? 12. Why should this dry belt cross the mountains at about 35 degrees south latitude? Why is it dry farther south on the east side? This explains why central and southern Chile have heavy rainfall.

13. Why should it be very dry on the Bolivian Plateau? 14. What months are included in the rainy season in Chile? 15. What portion of the Pacific coast of North America has its rainy season during the winter months? What months are these? 16. What semiarid land in South America is crossed by rivers that may be used for irrigating the soils?

17. Why should there be so heavy a rainfall just east of the Andes near the headwaters of the Amazon River? 18. Where is the rainfall heaviest in Central America and Panama? 19. What winds must bring that rain?

20. Where do most of the people live, — near the coast or inland? in mountains or in lowlands? near or far from rivers? Tell why they choose these places to live in. 21. Why do so few people live in the Amazon Lowlands away from the main river? 22. Why do so few people live in western and southern Argentina?

23. Why are many of the western cities in the high plateaus? 24. What parts of South America are most densely populated? 25. What geographic advantages attracted people to these centers? 26. Where is the population most likely to increase? Why? 27. How do the people make a living who are in areas of less than 10 inches of rainfall a year? Give examples from South America.

28. Which are the young, rugged mountains of South America? 29. How do they differ in general appearance from the old, worn-down mountains? 30. What mountains in North America do the Andes resemble? 31. Where are the old, worn-down mountains? 32. What mountain areas in North America do the Guiana and Brazilian Highlands resemble? 33. Name the great lowland areas. 34. Where is the widest part of the belt of shallow water (continental shelf) around South America? 35. Are the Falkland Islands on the continental shelf? 36. Where do the icebergs come from that float about in the ocean south of this continent?

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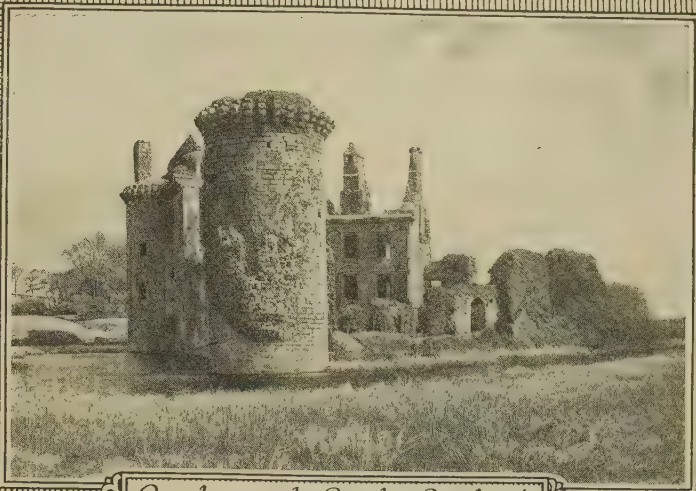
Conway Castle, Wales



Caerlaverock Castle, Scotland

EUROPE

INTRODUCTION

The ancient castles suggest at once the historic interest in almost every European scene. Europe has long been occupied by civilized, progressive peoples, and its civilization has had a profound influence upon almost all the nations of the world. The choicest of the world's music, much of its best literature, the finest works of sculpture, and the greatest paintings have been produced by Europeans.

The discovery of the power in steam, the invention of the printing press, the discovery of the X-rays that have made it possible to take pictures through clothing, wood, and even through flesh, the invention of wireless telegraphy, and many other valuable scientific discoveries and inventions have been made by Europeans.

The explorers and settlers who first came to the new world were Europeans (*see Appendix, Plate A*), and now every nation in Europe is represented in the population of the United States. From the earliest days of settlement along our Atlantic coast we have maintained commercial relations with the countries of Europe, and the heaviest ocean traffic to-day is between the ports of western Europe and those of our Atlantic coast states. *See Appendix, Plate B.* The World War awakened and renewed our interest in the people of all the countries of the world, but especially in the people of Europe. Here new countries were established, and in most of these countries a republican form of government was organized. The future development of the nations of Europe is of very great interest and importance to us.

People. Europe was peopled for the most part by members of the white race who are supposed to have come from west central Asia. Some of them migrated into the eastern Mediterranean region and then into southern Europe. From these people the Italians and Greeks have descended.

Other groups of the white race migrated north of the Caspian Sea and moved westward into the great plains of central Europe. The Celts, Teutons, and Slavs followed this northern route. From these races came the people who now make up the nations of central and northwestern Europe.

The Finns and Laplanders are related to the yellow, or Mongolian, race, which populated eastern Asia. The Turks are descended from Mongolian invaders who swept through western Asia in the thirteenth century, and later pushed into the Balkan Peninsula. They now live in the area in and about Constantinople. The Magyars of Hungary are also descendants of Mongolian invaders, but of still earlier days.

Growth of nations. The subdivision of Europe into many peninsulas and highlands and into lowland areas surrounded by mountains, and the presence of islands near the continent, have led to the growth of many distinct nations. No other continent has so many separate nations. People who are shut off by themselves usually have their own language and customs and often wish to be independent. Mountain peoples everywhere in the world are great lovers of freedom.

Natural Regions

Europe may first be divided for purposes of study into five large natural regions: (1) the Northwest Highlands, (2) the Central Plains, (3) the Central Highlands, (4) the Southern Mountains and Plateaus, and (5) the Southern Lowlands. *See map on page 161.* Each of these regions may be subdivided for the detailed study of any country.

Fig. 311. This is Ben Nevis, the highest mountain in Scotland. The Scotch word "ben" means *mountain* and is often used before the name of a peak, just as the word "mount" is used in English. Locate Ben Nevis on your map. To what natural region does it belong? What is its height?

Northwest Highlands. This is a coastal region where fishermen live, where many men become good seamen, where great explorers have been brought up, where excellent harbors have helped the growth of cities, where, in places, coal and iron have led to an industrial life, and where commerce has become very important. It is a region of cool temperate climate, which makes the people energetic. The peninsula of Brittany in France, most of the British Isles, and most of the Scandinavian Peninsula are included in this natural region (Figs. 311, 312).

MAP STUDIES

Use map on page 161. 1. Find the name "Northwest Highlands." 2. Are the mountains of this natural region young and rugged or old and worn down? 3. Through what large group of islands do the Northwest Highlands extend? When more of the continent stood above the sea, this highland belt was a continuous mountain mass extending from the Upland of Brittany to North Cape.

4. What is the general elevation of the highlands in Norway? In the mythology of the Norse people this cold region, in places almost inaccessible, was supposed to be peopled by the frost giants, or Jotunns, and the name "Jotunnheim," which means *home of the giants*, is still used.

Use maps on page 216. 5. What winds bring rain to the Northwest Highlands? 6. How much rain falls in the different parts of the highlands? 7. In what part of this natural region is the population densest? Why?

Central Plains. Turn to the map on page 161 for the location and extent of the Central Plains, and to the map opposite page 216 for the surface features and vegetation. This is the great food-producing area of Europe (Fig. 314). It includes the larger lowlands of France, the plain of southeastern England, almost all of the land in the low countries bordering the North Sea, all of northern Germany, most of Poland, and most of Russia. In the densely settled parts it is divided into small farms that are cultivated most thoroughly. Where the population is sparse there are forests or great tracts of grazing lands.

The Central Plains extend so far from north to south, and so far inland, that there are great differences in climate within the region, and therefore great differences in the vegetation and in the occupations of the people. In the tundra region of the Far North there are mosses, lichens, low bushes, and dwarf trees; some of the trees are only a few inches high. The ground is

Courtesy of Williams, Brown, and Earle

Fig. 312. The old, worn-down mountains along the coast of the Scandinavian Peninsula have sunk, allowing the sea waters to enter the valleys, and making steep-walled fiords like the one in this view. Notice the location of the little village on the narrow strip of lowland by the water

frozen except for a few months, and as water cannot sink into the ground this land is marshy during the summer. Toward the north pole vegetation disappears. The reindeer moss is the most valuable plant in the tundra; it makes possible the life of the reindeer, the animal which provides many people with milk for food and skins for clothing. The reindeer is also used as a draft animal in arctic regions.

South of the tundra there is an extensive evergreen forest. The timber is used for masts, for building, and for fuel. Most of the cutting is done in the winter, and in the spring the logs are floated down the streams. From the best logs lumber is made; the poorer material is used for matches or wood pulp. This forest extends westward into the Scandinavian Peninsula.

Fig. 313. This is a view in the Central Highlands near the boundary between Czechoslovakia and Germany. The mountains here are old and worn down. The little towns and villages are located in the open valleys between the mountains, where there is enough fertile soil for agriculture. What are the chief natural resources of this region?

In the grasslands south of the forests there are large areas used for raising wheat, rye, oats, and barley. Potatoes are grown everywhere except in the very coldest or driest places. The sugar beet is one of the most important plants of the plains of central Europe; peas, beans, and other vegetables are raised in abundance.

In the lowlands of southern France the climate becomes mild like that of the other lowlands in the Mediterranean region. Grapes are extensively cultivated here, and many other kinds of fruit are raised.

In the drier portions of southeastern Europe, where the winters are severe and the summers hot, stock-raising is the chief occupation. Here the lands are often called steppes, which means lowland plains without trees. The people of the dry steppes are tent-dwellers who move about with their herds of cattle and flocks of sheep. Near the Caspian Sea there is a semidesert where very few plants can grow.

MAP STUDIES

1. *Use map on page 161.* On what bodies of water do the Central Plains border? 2. What is the general elevation of these plains? 3. What old, worn-down mountains are on their northeastern margin?

4. What young, rugged mountains are on the southern margin of these plains? 5. What hills rise above these plains at a distance of about 200 kilometers northwest of Moscow? 6. What highland region, with old, worn-down mountains, is south of the western part of the Central Plains?

7. *Use maps on page 216.* What is the rainfall on the western margin of the Central Plains? in the central part? in the eastern part? 8. Why does western Europe receive more rain than eastern Europe? 9. In what part of the Central Plains of Europe is the population densest? Why?

Central Highlands. This part of Europe contains the great iron and coal mines that made it possible for central Europe to become an industrial district and for Germany and Austria to continue the great World War from 1914 to 1918. It is a region having large and varied mineral resources, water-power, and many excellent forests, and is therefore a region of very great importance to the future industrial life of the nations of Europe. This natural region extends into France, Belgium, Luxemburg, southern Germany, Austria, and western Czechoslovakia (Fig. 313).

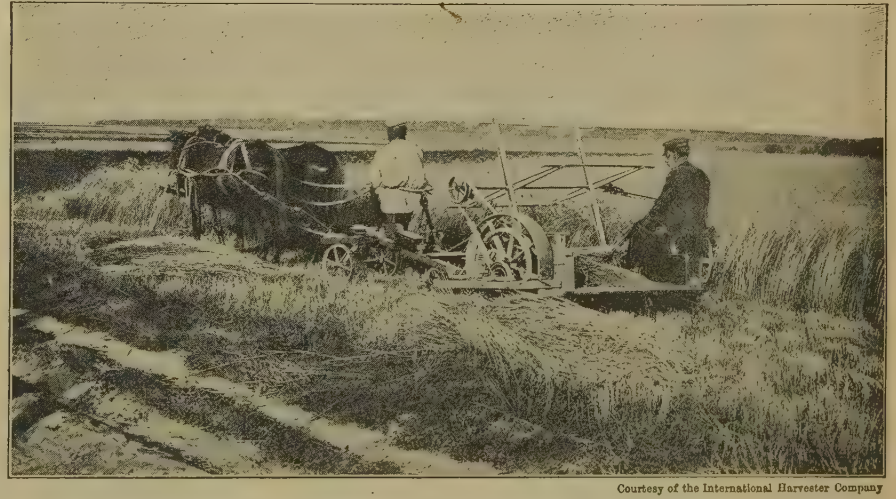
MAP STUDIES

1. *Use map between pages 181 and 184.* Into what countries do the Central Highlands extend? Are the mountains young and rugged or old and worn down? Make a list of the chief mountain ranges in this natural region. What mountains in the United States do you think they resemble in general appearance? *See also map opposite page 216.*

2. What plateaus are included in these highlands? 3. Between what mountains is the lowland plain of the middle portion of the Rhine River? 4. Make a list of the chief mineral resources found within this natural region.

5. *Use maps on page 216.* What is the rainfall in this region? 6. Where is the population densest in this region?

Home work. *Use figures on page 268.* List the January and July temperatures for Belgium, Poland, northern Russia, east central Russia, and Ukraine. Where is the change in temperature from January to July the least? Where is it greatest? Explain. Study, in this connection, the ocean-current map on page 275.



Courtesy of the International Harvester Company

Fig. 314. The Central Plains of Russia produce great quantities of wheat and other grains. This view shows an American harvesting machine at work cutting wheat in this region. Although large numbers of the Russian people still cultivate the soil entirely by hand, modern farm machinery is gradually being introduced, making possible a great increase in the amount of food that can be raised

Southern mountains and plateaus. South of the Central Highlands are the magnificent peaks of the Alps, standing out in strong contrast to the older mountains (Fig. 315). They form one of the many ranges of young, rugged mountains of southern Europe.

These high mountain ranges are not great food-producing areas and are not densely populated. The Sierra Nevada and the Carpathian Mountains have wonderful mineral resources and contain many mining towns. The Pyrenees are attracting more and more visitors each year. The Alps, with their perpetual snow-fields and with great glaciers about their summits, are visited for pleasure by more people than any other mountains in the world. They have wonderful waterfalls and many lakes of superb beauty. Some of the water-power is being utilized.

The Apennines have been largely stripped of their forests. The higher parts are used as summer pastures, and the lower slopes are cultivated. This range does not contain valuable ores. The ranges of the Balkan Peninsula are forested and are used chiefly for grazing.

In the Caucasus there are hundreds of glaciers and many beautiful mountain panoramas. There is now but one road crossing this range, and there are very few settlements in the mountain area.

MAP STUDIES

1. *Use map between pages 207 and 210.* Give the location of the Sierra Nevada, the Pyrenees, the Apennines, the Alps, the Carpathians, and the Caucasus. 2. What are the three large peninsulas of southern Europe? 3. What countries have young and rugged mountains? 4. Where is the largest plateau of southern Europe?

5. *Use map on page 216.* In what part of the Mediterranean region is the rainfall heaviest? How much is it? At what season does it come? 6. *Use figures on page 268.* What are the January and July temperatures in southern Italy? How much difference is there from summer to winter?

MAP STUDIES

1. Is any part of Europe north of the arctic circle? 2. Where does the parallel of 40° north latitude cross Europe? Does the larger part of Europe lie north or south of that parallel?

Fig. 315. The Matterhorn is one of the most beautiful peaks in the Alps. Notice the snow-fields on its rugged slopes and the bank of soft, fleecy clouds which separates it from the mountain side in the foreground. To what class of mountains do the Alps belong?

3. Is the larger part of the United States north or south of that same parallel? *See Appendix, Plate A.* 4. Compare the size of Europe with that of Canada; with that of Brazil. *See Appendix.* 5. How much larger than Europe is South America? How much larger is Asia?

6. Where does Europe come nearest to Africa? 7. What cape in North Carolina is as far south as any part of Europe? *See western margin of map.* 8. Which is farther from the equator, Mt. Fuji, the beautiful volcano of Japan, or Mt. Etna, the great volcano in Sicily? 9. About how far, in kilometers, is Mt. Vesuvius from Rome? About how far in miles?

10. About how far in kilometers is it in an air line from London to Paris? About how far in miles? Compare that with the distance from Boston to New York. About how far is it from Paris to Berlin? Compare that with the distance from New York to Chicago.

11. What water bodies should you cross in sailing from the Atlantic Ocean to Petrograd? to Odessa? 12. Is the North Sea or the Mediterranean Sea the deeper? 13. In what part of Europe are the lakes most abundant?

14. Why has Europe more good harbors than South America? 15. What large river flows into the Caspian Sea? 16. Find, on the map, the names of three large rivers that flow into the Black Sea.

17. What river flows into the north end of the Adriatic Sea? 18. What river flows into the Gulf of the Lion? 19. Name two large rivers that flow into the North Sea.

20. What large rivers flow northward into the Baltic Sea? 21. If the sea level sank 100 fathoms (600 feet), which would be the same as the sea bottom rising 600 feet, what large islands would become part of the mainland of the continent?

Home work. Learn to locate accurately from memory on an outline map the following:

Dardanelles	Mediterranean Sea
Bosporus	Caspian Sea
Sea of Marmora	Black Sea
Alps	North Sea
Pyrenees	Baltic Sea
Apennine Mountains	Adriatic Sea
Carpathian Mountains	English Channel
Balkan Mountains	Po River
Pindus Mountains	Volga River
Caucasus Mountains	Elbe River
Ural Mountains	Seine River
Timan Range	Vistula River
Valdai Hills	Danube River
Central Plains	Rhône River
Plain of Hungary	Rhine River
Plain of the Po	Strait of Gibraltar

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Southern lowlands. In the valley of the Danube is the Plain of Hungary. It is a broad, river-made land formed of the fine soil materials washed from the surrounding mountains. This is one of the best farming and grazing regions in the world (Fig. 316). Vast supplies of food are produced on this plain.

South of the Alps and north of the Apennines in the valley of the Po there is another river-made land. Here the soils washed from the neighboring mountains have filled in the head of the Adriatic Sea. This is a well-watered land with rich soils. Most of it is under cultivation, and it supports a large population.

The narrow lowlands on the coast of Portugal, Spain, Italy, and the countries in the Balkan Peninsula are orchard lands, where large supplies of subtropical fruits, such as oranges, lemons, olives, and figs, are raised.

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Fig. 316. The great plain of the Danube and its tributaries is one of the richest agricultural regions in Europe. This view of the river was taken on the frontier between Jugoslavia and Hungary. In the distance the level plain extends as far as the eye can see. On the opposite bank is a herd of the cattle which are raised extensively in this region

MAP STUDIES

Use map between pages 207 and 210. 1. What mountains surround the Plain of Hungary? 2. Into what countries does this plain extend? 3. What river drains the lowland of northern Italy? 4. Where do narrow coastal lowlands border the Mediterranean Sea?

Coast Line

The North and Baltic seas and the Mediterranean and Black seas extend far into the continent of Europe. These great irregularities of the coast line, as well as the smaller irregularities, are of very great importance to the life of the people.

No part of Europe except central and eastern Russia is very far from the coast. The continent is landlocked on one side, and still its coast line of about 50,000 miles is longer than the coast lines of South America and Africa combined, though South America is nearly twice and Africa three times as large as Europe. Europe is fortunate in having many excellent harbors.

The inhabitants of the lands bordering the seas naturally became skillful fishermen and sailors. They first followed the sea as traders and explorers; later they made good colonists, and in time they developed great commercial nations. The peoples of western Europe have led the world in seafaring occupations.

Home work. 1. On an outline map of Europe shade or color the area that is more than five hundred miles from an ocean or an arm of an ocean. 2. Find out what parts of the world are now controlled by Europeans or descendants of Europeans. Shade or color those parts on an outline map of the world.

Problems and review questions. 1. Why should the people in America be especially interested in the people of Europe? Give at least five good reasons. 2. What nations of Europe are represented in the population of your school district? of your city or town? 3. How does the size of Europe compare with that of Canada? of Asia? 4. How far is Europe separated from Africa at Gibraltar? *Use scale on map between pages 207 and 210.* 5. Why do irregular coast lines lead men to become seamen and explorers?

6. To what race do most of the people of Europe belong? 7. What people in Europe belong to the Mongolian, or yellow, race? 8. Why did so many distinct nations develop in this continent? Give examples. 9. Give a brief description of the five large natural regions of Europe.

Influence of the Ice-Sheets

In studying North America we learned of great ice-sheets that formed in Canada. Europe also had great ice-sheets during the same glacial period (Fig. 317). They formed on the highlands of the Scandinavian Peninsula and spread in all directions, advancing eastward into central Russia, southward across the Baltic Lowland and the plains of Germany to the margin of the Central Highlands, and southwestward until they invaded the British Isles.

In all the high mountains there were glaciers, and those that remain to-day are but remnants of much longer glaciers of the great ice age.

Over most of the land where the ice was there is a covering of glacial soils. The deposits left by the ice contain bowlders and look much like the glacial deposits in North America.

Thousands of small lakes in northwestern Europe and in the high mountains of southern Europe are in valleys blocked with glacial deposits.

Climate

The surface waters of the eastern part of the North Atlantic Ocean are warmed by the Gulf Stream Drift (*see map, p. 275*), and the winds that blow over those waters help to warm the air over the lands of western Europe during the winter season. Except in the Far North the countries of western Europe do not have long periods of frosts; that is, there are no very long periods during which the temperature falls below the freezing point of water. This is a great advantage to agriculture.

In eastern Germany and in Poland there are over two months of frosts, and in eastern Russia there are over four months of frosts each year. In the bleak tundra region bordering the Arctic Ocean there are frosts for more than six months, and the temperature remains continuously below the freezing point for a great part of that time.

In summer eastern Europe has a period of between two and four months when the temperature each day rises to over 70° F., while in western Europe the winds that come from the west and have passed over the Atlantic Ocean tend to prevent such a long warm period.

Fig. 317. This map shows the extent to which the continental ice-sheets spread over Europe. From what center did they come? Through what countries does the line of the southern limit of glaciation pass? What European countries have never been covered by an ice-sheet? What mountains of Europe still contain glaciers?

The large seas that extend far into the continent help to keep the temperatures of western and southern Europe warmer in winter and cooler in summer than they would otherwise be. Changes in temperature are always less marked in lands surrounded, or nearly surrounded, by ocean waters.

Home work. Find out in how many months there are frosts in your home region. What part of Europe is similar to your home region in this respect?

In the Mediterranean lands, except in the high mountains, the winters are without long periods of frosts, and for over two months of the year the daily temperature averages more than 70° F. In the extreme south of Spain and Italy there are over four months when the average daily temperature is 70° F. or more.

The winds from the Atlantic bring rain to the western lands each month of the year. As they pass on eastward they have less and less moisture to give up, so the rainfall decreases as we go from west to east across the continent of Europe. *See map on page 216.*

In general the mountain areas receive more rain than the lowlands. Far to the north the rainfall decreases, as it does in all countries in high latitudes, because the air is too cold to carry much moisture.

Europe may therefore be divided into three climatic regions: (1) the west, with only slight changes in temperature and with rain during all seasons of the year; (2) the east, where the changes in temperature from summer to winter are great and rain comes chiefly in the summer; and (3) the Mediterranean region, with dry, hot summers and mild and somewhat rainy winters.

Natural Resources

Europe is fortunate in its mineral resources, in the extent and quality of its forests (*see map opposite page 216*), and in the rich soils of the lowlands suitable for agriculture. The waterways, the water-power, the harbors, and the fish of the shallow seas are very valuable.

The beautiful scenery and the places of historic and artistic interest are of great educational value, and they bring thousands of tourists to the different European countries each year.

In each of the countries of Europe the occupations and the prosperity of the people have been determined largely by the climate and natural resources of the regions in which they live.

Problems and review questions. 1. What are the chief occupations of the people who live in the Northwest Highlands of Europe? 2. How do the mountains of northwestern Europe differ from those of southern Europe?

3. How may the hills of England, Ireland, and Brittany be explained? 4. Where did the great continental ice-sheet of Europe form? 5. How did the ice change the surface of the country that it invaded?

6. What are the chief occupations of the people in the different parts of the Central Plains, — (*a*) in the tundra district? (*b*) in the great forests? (*c*) in the grassland areas? (*d*) in the dry steppe region? 7. What part of Europe has the shortest period of frosts? Why? 8. How do the inland seas affect the temperatures of the neighboring lands of Europe?

9. In what natural regions of Europe are there large supplies of coal and iron that have led to the growth of industries? 10. Why do great numbers of tourists visit Switzerland? 11. How does the life in the high mountains differ from that on the plains? 12. Where are the chief lowland plains of southern Europe?

Fig. 318. This is the home of George Washington's ancestors in England. The quaint old house was built several hundred years ago and stands in the midst of a fertile farming country

Courtesy of Joseph W. Worthen

Fig. 319. In England there are many beautiful homes like this, which are often called manor houses. Such a house is usually the home of the owner of the estate, or manor

Courtesy of Williams, Brown, and Earle

Fig. 320. Many of the farmers of the lowland of England live in low, thatch-roofed cottages like this. Study the map on page 171 and name some of the products which they raise

BRITISH ISLES

The British have become a great industrial and commercial people. In the early days of active geographic exploration their mariners were among the most daring and adventurous. They visited almost all the lands of the earth, and to-day the British Empire is the largest and most widespread in the world.

Physical features. The British Isles consist of Great Britain and Ireland and nearly 5000 smaller islands near by. They are often called the United Kingdom. Great Britain includes England, Scotland, and Wales. Ireland includes the newly formed Irish Free State, which occupies the central and southern parts of the island, and Ulster, which occupies the northern part.

The shallow sea around the British Isles is nowhere over 600 feet deep. If the sea bottom should rise 300 feet, the British Isles would be connected with Europe. Formerly they were a part of the mainland, but the western portion of Europe sank, and the sea, advancing over the lower portions of the land, separated the British Isles from the rest of the continent. There is now a plan to connect England with France by a tunnel under the Strait of Dover. At the narrowest place this strait is about 20 miles wide.

Coast. The shore lines of the British Isles are very irregular, owing to the sinking of the land (Fig. 321). The mouths of the rivers are drowned. Some of the river mouths, like those of the Thames and Mersey, are wide and bordered by lowlands. They are called bays. In the north, where the river mouths are narrow and bordered by hills or mountains, they are called firths. The bays and firths allow vessels to go far inland with raw material, and have therefore become very valuable in the industrial and commercial growth of Great Britain. Some of the drowned river mouths have been bridged, and in large cities like London tunnels have been made under the rivers.

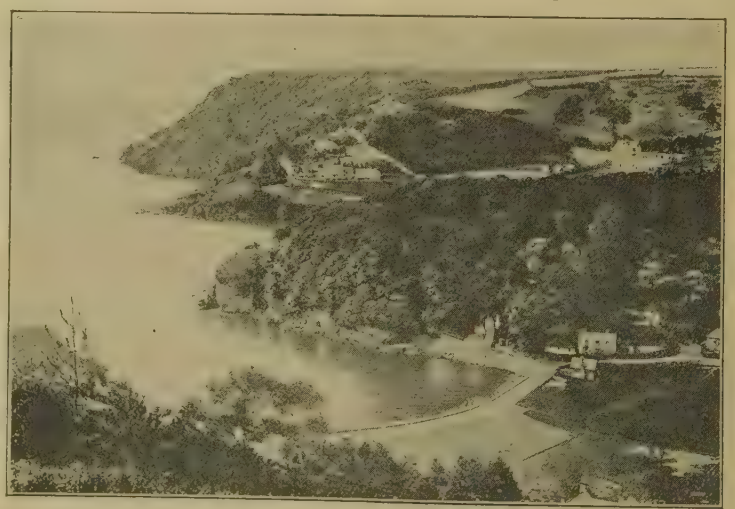

Fig. 321. This view on the coast of southwestern England shows the irregularity of the coast line. How do you explain this irregularity? Of what advantage is it to the nation? Notice the level land at the head of the little cove in the foreground, and on the upland. For what purposes may these level stretches of land be used?

Highlands. Most of the British Isles are a part of the Northwest Highlands. *See map on page 161.* In northern Scotland there are low, picturesque mountains and many beautiful lakes (Figs. 322, 323). In southern Scotland, in Wales, in southwestern England, and in Ireland the upland hilly districts are all that is left of an old mountain region.

Lowlands. The lowland of England, which extends from Birmingham to Liverpool, is a busy industrial district and the most productive part of the country. In central Ireland the lowland area, which covers about a third of the whole island, is an agricultural land. The lowland extending across Scotland is located in a belt where the land dropped down, forming a deep valley. This is an industrial district, but there are many cultivated fields here. The southeastern lowland plain of England is a part of the Central Plains of Europe. It is a grazing and agricultural region.

Influence of the ice-sheet. The portion of the European ice-sheet (Fig. 317) which moved southwestward from Scandinavia crossed the area where the North Sea now is and invaded the British Isles. In time the ice covered almost all of these islands. When later the climate became warmer, the great ice-sheet melted away, but the deposits of bowlders, the many lakes, and the glacial markings on the rocks remain as proofs that the ice was once there.

Fig. 322. This is a view of Loch Lomond, one of the beautiful lakes in the Scottish Highlands. To what type of mountains do these highlands belong? About how high are they?

Climate. There is some variation in temperature in the various parts of the British Isles because of the differences in latitude and in elevation; that is, in general it is colder in the north and on the small islands north of Scotland than it is in the south of England and Ireland, and colder in the highlands than in the lowlands. The presence of the sea, however, prevents any great extremes of temperature.

No part of this land at sea level has a temperature as low as 32 degrees F. even during January, which is the coldest month of the year. The warmest part is around London, and the temperature there during July is about 64 degrees F. The seas about the British Isles never freeze, and the rivers seldom freeze. When snow comes, it remains but a few days, except on the higher lands in the north.

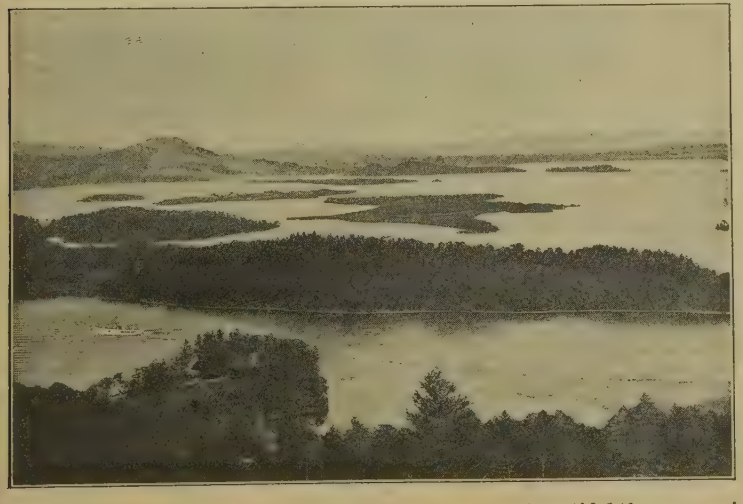

Fig. 323. A broader view of Loch Lomond shows how beautiful the scenery is in the Scottish Highlands. The lakes are surrounded by low, wooded mountains and dotted with islands of different shapes and sizes. On account of its beauty this region is visited every year by large numbers of tourists

The prevailing winds are from the southwest. They bring an abundance of moisture, and fogs and mists are very common. The rainfall is heaviest on the western slopes of the higher lands. *See map on page 216.*

Natural resources. The irregular coast line of the British Isles affords many excellent harbors. The shallow waters about the coast abound in fish, and the British fisheries are now among the richest in the world.

In the British Isles there are many rivers which have been of great importance in the industrial growth of the islands. Large ocean vessels can go fifty miles up the Thames to London. The Clyde is also navigable, and ocean vessels pass upstream as far as Glasgow (Fig. 324). There are many smaller streams throughout the British Isles which, because the rainfall is heavy and much of the country is hilly, furnish good water-power.

In the ground men have found coal, iron, lead, copper, and tin. Coal is the most important mineral product; and because of the nearness of the coal to the ports, Great Britain exports more coal than any other country. The tin has been largely worked out. The finding of iron and coal close together (*see map, p. 171*) has made possible the development of manufacturing in England, southern Wales, and southern Scotland. Such big industries as the shipbuilding of the Clyde have developed because of the presence of coal and iron in the same locality.

Excellent building stones have been found, including marble and slate. These building stones are next in importance to coal and iron. In southeastern England there is a formation of chalk which is used in making cement. There are also excellent deposits of clay in England, which have led to the manufacture of pottery.

Fig. 324. The Firth of Clyde, near Glasgow, is lined with wharves where at any time great ocean-going vessels may be seen loading and unloading their cargoes and taking on coal and supplies. Locate Glasgow and the Firth of Clyde on your map. Why has Glasgow become the leading port of Scotland?

Fig. 325. The men in this picture are Scotch fishermen whose home is on the northern shore of the Firth of Forth. The old man is mending one of their wicker fish-baskets

Fig. 326. These fishing boats are being towed out to the fishing banks from one of the Scottish ports on the North Sea. What different kinds of fish will be found in their catch?

Fig. 327. This is the fish market on the wharf at Aberdeen, where the fishermen bring their catch to be sold. Why has Aberdeen become an important center for the fish business?

Occupations. The lowlands invited the early inhabitants of these islands to undertake farming. In many places the land is still under cultivation. At the present time more and more of the agricultural land is being used for manufacturing plants.

Fishing was also one of the earliest occupations and has continued to grow in importance as the population has increased. Large quantities of cod, herring, mackerel, and sole are brought in by the fishermen (Figs. 325, 326, 327).

From the earliest days the highlands and uplands have been used for the grazing of cattle and sheep, but for a time the people sent the wool from their flocks over to Flanders, and the busy looms of Bruges and Ghent manufactured most of the English wool.

During the time of religious persecutions in northern Europe many skillful weavers sought safety across the Channel, and weaving soon became a very common occupation in England. Large quantities of wool are now produced in the British Isles and manufactured in the home mills. England supplies many other countries with a high grade of woolen cloth.

With the great increase in population, and with the discovery of coal and iron, the manufacturing plants increased in number and size, and cotton and other raw materials began to be imported. More ships were built and more and more of the British people entered commercial life. In time the manufacturing industries and commerce became the chief occupations in the British Isles.

Fig. 328. The Manchester Ship Canal connects the city of Manchester with the mouth of the Mersey River. It is deep enough to allow large ocean vessels to reach the city, making Manchester an important port

Home work. On an outline map of the world, name and color the different parts of the British Empire. *See pages 168 and 169.* This will bring out clearly the interest which the British people naturally have in all parts of the world. British commerce has developed largely with British possessions. *See Appendix, Plate B.*

Cities. At the eastern base of the Pennine Mountains are **Leeds** and **Bradford,** where woolen goods are manufactured. Water-power was first used to run the mills, but now coal is brought from the neighboring coal fields. **Manchester,** connected by canal with the sea, is also a manufacturing center (Fig. 328). Cotton brought here in large quantities from our Southern states and from other parts of the world is manufactured into cloth. The dampness of the air on the western side of the Pennine Range is favorable to this industry, for the cotton fiber can be made into cloth more easily if it is a little moist than if it is dry.

Fig. 329. The landing stages at Liverpool are always busy and are often crowded with people. Liverpool is the leading port of Great Britain for the trade with America. What are its chief exports and imports?

Liverpool, the coast city nearest to this remarkable manufacturing district, is one of the greatest ports in the world and does a tremendous business (Fig. 329).

Sheffield is famous for its iron-and-steel industry. Coal is near at hand, and when the industry first started there was a supply of iron. This is now largely exhausted, but iron is imported from other countries. Excellent grindstones are made near Sheffield; they are very important in the manufacture of cutlery. **Birmingham**, centrally located in England, is in another manufacturing district. It has an abundance of coal, and its iron-and-steel industries occupy the time of many thousands of people.

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Fig. 330. This is an aëroplane drawing of London and its surroundings. The numbers show the location of the following places of interest: 1, Regent's Park; 2, Kensington Gardens; 3, Hyde Park; 4, Buckingham Palace; 5, British Museum; 6, National Gallery; 7, Trafalgar Square; 8, Charing Cross; 9, Westminster Abbey; 10, Houses of Parliament; 11, St. Paul's Cathedral; 12, London Bridge; 13, Tower of London; 14, Victoria Park. At Harrow-on-the-Hill is a famous school for boys which was founded fifty years before the landing of the Pilgrims at Plymouth

London, the seat of the British government, is located at the head of the estuary of the Thames. It is one of the most interesting cities in the world (Figs. 330, 331, 333). Its location was first determined by some high ground on the banks of the Thames, where a bridge could be built across the river. Modern London has grown up around this bridge. The city is far inland and is surrounded by plains. Easy means of transportation has been one of the great natural advantages of its location, and it has become a railroad and manufacturing center. Its position on the eastern side of the islands is a natural advantage, for the commerce with the countries of western Europe naturally comes to this port. The river is lined for miles with docks, and yet there are not places enough for the vessels that are in this port at one time. It is commonly reported that London is the largest city in the world, but that is not true unless the population of a very large suburban district is taken into consideration. The population of London proper is now a little smaller than that of New York City. *See Appendix.*

Picture study. Fig. 330 shows the city of London and its surroundings. Study this figure carefully and answer the following questions: 1. On what river is London situated? 2. In what direction is the river flowing? 3. Describe the country around London. 4. Notice the large number of railroads. Why is London such an important railroad center? 5. Find London Bridge. This is near the spot where the first settlement of London was made. 6. Find the Greenwich Observatory. What meridian of longitude passes through Greenwich? *See map on page 171.* The Greenwich Observatory was built in 1675, and all English-speaking people measure longitude by the number of degrees east or west of it. 7. Find the location of the Houses of Parliament. This is where the House of Lords and the House of Commons meet.

Fig. 331. This is the Tower Bridge in London, so named because it spans the Thames near the famous old Tower of London. Notice the way in which the parts of the bridge are raised to allow the boats to pass through. Name some of the raw materials which are brought to London by water. From what places do they come?

Fig. 332. Princes Street is the principal thoroughfare in Edinburgh. In the foreground of this view are the beautiful public gardens. Beyond the gardens is the tall monument erected in honor of Sir Walter Scott, the great Scottish writer. On the hill at the left is the castle which used to be the home of the Scottish kings

Aberdeen, in Scotland, is a university town. It is also an important fishing port (Fig. 327) and the center of a manufacturing district. There are important granite quarries close by.

Edinburgh, the capital of Scotland, is beautifully situated about a picturesque crag on the margin of the Scottish lowlands, and its busy seaport, **Leith**, connects this region with the North Sea and the European ports (Fig. 332). It is best known for its advanced methods in banking and insurance and for its excellent medical school. A trip from Edinburgh to Glasgow takes one through the lake region of Scotland. **Glasgow** is located on the Clyde River, in the lowlands of Scotland, near rich coal and iron fields. It is in the midst of one of the greatest ship-building regions in the world. As a commercial center Glasgow ranks first in Scotland and second in the United Kingdom. Since the Clyde has been deepened Glasgow has become a great modern port, and it is also an important center for railroad traffic.

Fig. 333. This beautiful church is Westminster Abbey in London. It was built more than seven hundred years ago and contains many monuments to famous men. Find its location in Fig. 330

Belfast, the capital of Ulster, has developed a large ship-building business. There is an abundance of labor and excellent facilities for launching vessels at this port (Fig. 336). Iron, steel, and coal are easily brought by water from Great Britain. Belfast is also the center for the manufacture of the wonderful Irish linens. Flax thread is usually kept moist during the process of spinning and weaving, and the climate of Belfast is most favorable to this industry (Fig. 335). Much of the flax used in the manufacture of the linen is grown in northern Ireland, but large quantities are imported from Belgium, Russia, and the Baltic countries.

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Fig. 334. Blarney Castle is a picturesque ruin near Cork in Ireland; it is visited by large numbers of tourists

Dublin, the capital of the Irish Free State, is an important seaport. It is situated on the east margin of the central plain of Ireland, and the produce of this region is brought by way of canals to Dublin for shipping. This city has also become a center for the manufacture of silk and wool. **Cork**, an important city on the south shore of Ireland, is the port from which are shipped the cattle and dairy products of southern Ireland.

The British Empire includes (in Europe) the United Kingdom, Gibraltar, and Malta (Fig. 337); (in Asia) India, Cyprus, Aden, Ceylon, Straits Settlements, Federated Malay States, Borneo, Hongkong, and a few other small areas of lesser importance; (southeast of Asia)

Australia, Papua, New Zealand, Fiji, the Tonga Islands, the Solomon Islands, and the Gilbert Islands; (in Africa) St. Helena, Nigeria, Gold Coast, Sierra Leone, Gambia, Somaliland, British East Africa, Nyasaland, the Union of South Africa, Rhodesia, Bechuanaland, the Anglo-Egyptian Sudan, and other areas in Africa of lesser importance; (in America) Canada, Newfoundland and Labrador, British Honduras, British Guiana, Bermuda, British West Indies, and the Falkland Islands. Since the World War (1914–1918) the British people have control and direction of affairs in most of the former colonies of Germany.

The British dominions and colonies have been, and are, of very great value to the people of the British Isles. They have served as countries to which British people could emigrate, and where British capital could be invested. Foods and large quantities of raw material are

Fig. 335. The man in this picture is spreading out linen on a bleaching green near Belfast. Here the linen will grow white as it lies on the grass in the sun. Why is the Irish linen industry located in the neighborhood of Belfast? Where do the linen manufacturers get their flax?

imported from them, and many manufactured goods are sent in return. A serious defeat at sea would mean disaster to England's industries, and possibly starvation to her people.

The great merchant marine, the cables, wireless telegraphy, and the habit of travel have helped to hold the different parts of the empire together.

Government. The British government is a limited monarchy. The king inherits his position, but his power is limited. The executive power is in the hands of a Cabinet headed by a Prime Minister. Parliament, which controls most of the affairs of the nation, consists of a House of Lords and a House of Commons. The members of the House of Lords inherit their positions, but the members of the House of Commons are elected by the people.

Problems and review questions. 1. What great explorers came to America from the British Isles? 2. What countries are included in Great Britain? 3. What is meant by the United Kingdom? 4. How wide is the strait between England and France?

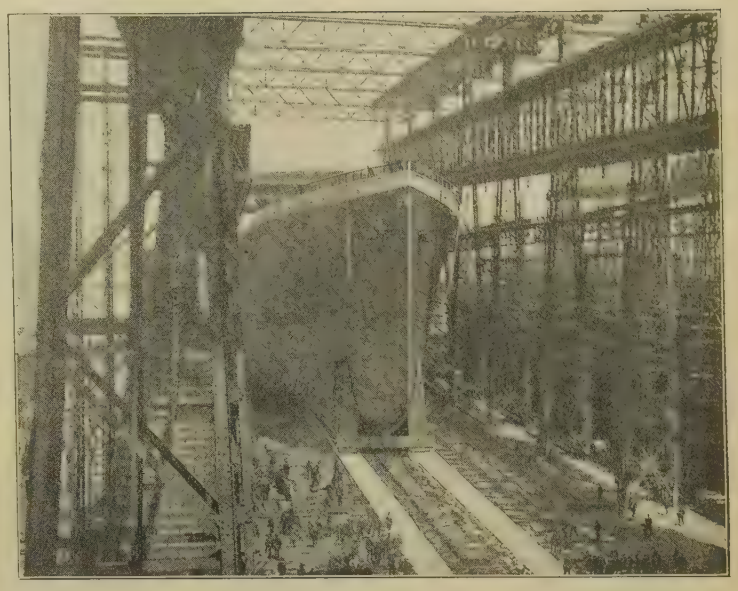

Fig. 336. This is a view in one of the shipbuilding yards at Belfast. The hull of a great ocean liner has been completed and it is ready to be launched. When the signal is given, it will slide off backward into the water. After it is afloat the workmen will install the machinery and build all the upper parts of the ship

5. What natural regions extend into these islands? 6. What is the highest mountain in Scotland? *See Fig. 311.* 7. Why should there be heavy rainfall, with many mists and fogs, in these islands? 8. Why are the changes in temperature during the year less than on the mainland?

9. Why did manufacturing become so important in these islands? 10. What have you seen that was manufactured in England? in Ireland? 11. What natural advantages has London? Liverpool? Sheffield? Belfast?

12. Of what value are the foreign possessions to the people of the British Isles? 13. What advantages are there for these possessions in belonging to the great British Empire? 14. What city is the capital of the British Empire? 15. About how long does it take to make the ocean voyage from New York to Liverpool?

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Fig. 337. This is the harbor at Malta. *See map on page 161,* H 8. The large ship in this picture has stopped here to take on coal. It is on its way from England to Sydney in Australia. Turn to Appendix, Plate B, and trace its route. How long does this voyage take? What products will this ship bring back to England?

MAP STUDIES

1. Only the most important commerce has been indicated on this map. What impression do you get of the importance of ocean traffic in this region as compared with any other part of the world? 2. Why should so much foodstuff be needed here? 3. Why should the British Isles be such important centers of manufacturing industries? 4. What sources of fuel have they? 5. Can they secure raw material easily? 6. Can they export their manufactured products readily? 7. From what seaports do they ship most of these products? 8. Why should the people in the low countries of Belgium, Holland, and Denmark be chiefly engaged in producing food supplies? 9. Why is the North Sea such a favorable region for fishing? *See also map opposite page 216.* 10. What kinds of fish are obtained from the waters near the British Isles?

11. Why should sheep be raised in England, Ireland, and Scotland? 12. Make a list of the chief seaports in each of the countries bordering the North Sea. 13. Why should we import cloth and metal goods from Great Britain? 14. What are the chief supplies that Great Britain secures from the United States? 15. Of what advantage is the Kiel Canal to commerce?

16. Why are the ports of Belgium, Holland, and Germany not at the seashore? 17. From the information given on this map what should you think were the chief occupations of the people in southern Norway? in the portion of Sweden shown on this map?

18. In what part of Belgium do we find the mineral resources that led to manufacturing? 19. What cities appear to be the leading railroad centers in this part of Europe?

20. Locate Greenwich and the prime meridian (0°) on this map. About how many degrees of west longitude are shown on this map? How many degrees of east longitude are shown?

NORWAY AND SWEDEN

THE SCANDINAVIAN PENINSULA

Physical features. The peninsula of Scandinavia consists of an area of old mountains in the north and west and a belt of land in the east and southeast known as the Baltic Lowland (Fig. 338).

The ice-sheet that formerly covered all of northwestern Europe helped to wear down the highland area and to deepen the canyons.

Fig. 338. This is a view of the city of Upsala in Sweden. How should you describe the land on which Upsala is built? To what natural region does this part of Sweden belong? *See map on page 201.* Upsala is a very old city and is the seat of the leading Swedish university. At the left in this view is the cathedral, the building of which was begun in the year 1289

It left many beautiful U-shaped gorges and great troughs where mountain lakes have formed. On the lowlands the melting ice left a mantle of sands, gravels, and other glacial materials, and among these deposits, called moraines, just as in the moraines of North America, there are thousands of lakes. One tenth of the surface of Sweden is now covered with glacial lakes.

The coast of Norway is a sunken shore line, and the combination of ice action and sinking accounts for its many irregularities and the many neighboring islands. The great fiords, some of which are over a hundred miles in length, are mountain canyons into which the sea water has come (Fig. 341). They were once occupied by ice. Many of the tributary streams tumble into these fiords and thus make beautiful waterfalls.

The streams of Scandinavia, especially on the western, or Norwegian, side, are very swift and furnish an abundance of water-power.

Climate. The prevailing westerly winds from the Atlantic Ocean bring moisture to Scandinavia, and as the moisture-laden air rises to cross the mountains it is so chilled that the moisture falls as rain or snow. In the higher mountains of Norway some of the snows remain and form beautiful valley glaciers. The Norwegian side of the peninsula receives much more rain than the Swedish side. The ocean winds also prevent great or sudden changes in temperature along the Norwegian coast.

Both countries have long, severe winters, because they are so far north. The ports of Sweden that open to the Baltic Sea are frozen during the winter, but owing to the presence of the warm waters in the Atlantic Ocean, and to the westerly winds, the waters in the harbors of Norway do not freeze over enough to stop fishing or navigation.

Because of the high latitude also the length of day and night varies greatly in Norway and Sweden. At North Cape the sun does not set from May 13 to July 29. This is the region commonly visited by tourists in the hope of seeing the midnight sun. Unfortunately North Cape is a foggy region, and many visitors are disappointed

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At Trondhjem during two of the summer months the nights are light. The sun goes below the horizon about midnight, but not far enough to cause absolute darkness. During two of the winter months the days are dark, for the sun is below the horizon except for a short time about noon.

Fig. 339. Here is a family of Laplanders whose home is in the northern part of the Scandinavian Peninsula. Notice the shape of their house. Of what materials do you suppose it is made? At the left are two reindeer. What other people who keep herds of reindeer have you studied about?

Natural resources. 1. Turn to the map opposite page 216 first. Where is the tundra of Scandinavia? 2. Is there any other part of Scandinavia without forest? 3. Turn to the maps on pages 171 and 201. Where are there iron deposits? 4. What kinds of fish are found in the shallow waters of the Baltic? 5. Where in the vicinity of Norway are cod and herring found? 6. From a study of the two maps referred to, where should you expect to find the best agricultural lands? 7. Where is water-power likely to be abundant? 8. From a study of the maps make a list of the natural resources of the Scandinavian Peninsula. 9. How may the beautiful scenery of Norway be made a valuable natural resource?

Distribution of people. In the Far North tribes of Laplanders wander about with their herds of reindeer or live in small fishing villages. During the winter they often travel southward into the forested region, and sometimes a few of them even reach Stockholm (Fig. 339).

The mountainous portion of the Scandinavian Peninsula is but thinly populated. Most of the Norwegian people live in cities or villages near or at the heads of the great fiords. In southeastern Norway there is a little lowland area near the coast, where there are a number of settlements. The Swedish people live chiefly in the southern portion of their country.

Occupations in Sweden. On the Baltic Lowland of Sweden agriculture is carried on. The chief crops are oats, rye, barley, potatoes, and sugar beets (Fig. 340). A small amount of wheat is raised. Much of Sweden is good pasture land, and a large part of the population is engaged in caring for the cattle and in dairying. Both of these occupations are increasing in importance.

Lumbering and the manufacture of woodenware and paper are next in importance to agriculture. A Swede named Lundstrom invented friction matches, and the manufacture of matches has become an immense industry in Sweden. Logs are imported from Finland and Russia to supply the need of wood in the match factories, and thousands of tons of matches are exported each year. Many of the Swedish people are engaged in the herring fisheries of the Baltic Sea.

Large numbers of workmen are needed at the iron mines. The iron ore is so valuable that a railroad has been built across the Kiolen Range of the Northwest Highlands to a point on the Norwegian coast where the harbor is never ice-bound. Much of this ore is shipped to England to be smelted, because of the lack of coal in Scandinavia.

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Fig. 340. These women are weeding a field of sugar beets in the southern part of the Baltic Lowland. What kind of soil is found here? What other crops are raised in this region?

Courtesy of Williams, Brown, and Earle

Fig. 341. The passenger and freight boats steam far up the Norwegian fiords, stopping here and there at the little fishing villages. Describe the life of the people in these villages

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Fig. 342. This Norwegian farmer has been cutting hay in the mountain valley above his home. The bundles of hay are fastened to a trolley and allowed to slide down to the barn

Fig. 343. The city of Bergen has grown up at the head of a deep fiord which forms an excellent harbor. Locate Bergen on the map on page 171. What is its latitude? How does its climate compare with that of the east coast of North America in the same latitude? What are the leading exports?

Fig. 344. Stockholm is an important port and shipbuilding center. This is a view of the shipping district of the city. At the left is the railroad. Along the water-front are the business buildings and warehouses. Why is the location of Stockholm less fortunate for a port than that of Bergen?

Occupations in Norway. About 70 per cent of Norway is barren, and about 20 per cent is forested; therefore the occupations of the people are chiefly connected with the sea. Life along the fiords makes the people thoroughly familiar with the water. Everyone there knows how to use a boat, and nearly every man knows how to build one. Here shipbuilding is a very important industry.

At the heads of many of the fiords there are small areas that are cultivated. Here vegetables and a little grain and hay are raised. In the small lowland area in the southeast there are good farms. High in the mountain valleys some hay is made, for it is very important to provide fodder for the cows (Fig. 342).

Many Norwegian fishermen go each year to the Arctic Ocean to engage in seal and whale fishing, and others go to the North Sea for cod and herring or to the waters around the Lofoten Islands to fish for cod. Norway has furnished many excellent seamen, and Norwegian ships are seen in all ports of the world. The beautiful coasts and wonderful mountain scenery bring thousands of tourists to Norway, and the care of these people has become an important occupation.

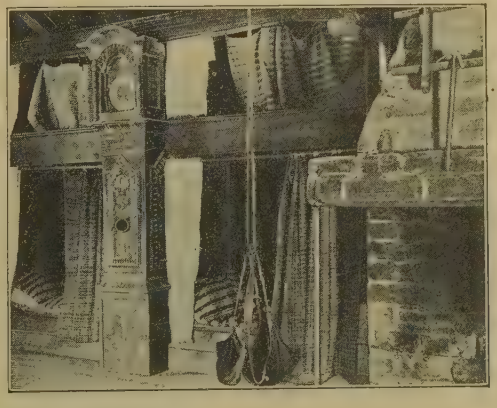

Fig. 345. This is a view in a Swedish peasant's home. The beds are built into the walls like berths, and are hung with curtains. Notice the fireplace and the old grandfather's clock

Cities. Nearly all the cities of the Scandinavian Peninsula are along the coast. **Christiania,** the capital of the kingdom of Norway, is in the most fertile part of that country, on Christiania Fiord. **Bergen,** the next city in size, is an important fish-curing center. Enormous quantities of fish are shipped from this port (Fig. 343). In the north are **Hammerfest** and **Tromsö.** The chief interest of these cities lies in the whale and seal fisheries.

Stockholm, the capital of the kingdom of Sweden, is located on Lake Malar. It is built upon islands and is sometimes called "The Venice of the North." It has wide streets, large buildings, and many bridges (Fig. 344). The palace of the king is on one of the islands. **Upsala,** the former capital, is a university town. **Göteborg,** the chief port for exports, is connected with Stockholm by canal and rail. Its harbor is rarely frozen, while the Baltic ports are blocked with ice for three or four months each year. **Norrköping,** where there are cotton, woolen, and flour mills, is the chief industrial center of Sweden. Machinery is also manufactured at Norrköping. The port of **Malmö** is a busy railway center.

Problems and review questions. 1. What part of Norway should you most like to visit? 2. When should you prefer to go there? 3. What should you expect to see? 4. Why has Norway not become a great manufacturing country? 5. Why is Sweden more of an agricultural country than Norway?

6. Why has Sweden a drier climate than Norway? 7. Why should the ports of Sweden freeze, while those of Norway remain open throughout the winter? 8. What industries have the Swedish people developed? 9. Locate Lapland on the map on page 201. What are the chief occupations of the Laplanders? 10. How is the reindeer valuable to the Laplanders?

11. Why are there no large inland cities on the Scandinavian Peninsula? 12. What is the capital of Norway? of Sweden? 13. Why have so many Norwegians become seafaring people? 14. What natural resource of great importance in manufacturing is almost lacking in Sweden?

DENMARK

The kingdom of Denmark comprises the peninsula of Jutland and a group of islands lying at the entrance to the Baltic Sea. The islands, which are more thickly settled than the mainland of Denmark, are close to the most densely populated portions of Norway and Sweden, and the people of the three countries have many interests in common.

Physical features. Denmark is a lowland country. *See map on page 171.* Most of the coast is sandy, and bordering the shore the waters are very shallow and there are lagoons shut in by shifting sand bars. There are, therefore, no very good harbors here. The harbor at Copenhagen is the only one that can be entered by the largest ocean-going vessels. The surface of the land is a gently rolling plain dotted with marshes and ponds.

Almost everywhere the soils consist of glacial deposits left by the melting of the great European ice-sheets (Fig. 317).

Fig. 346. This is a view of the harbor of Copenhagen. Study the location of Copenhagen on the map on page 171, and notice how near it is to Malmö in Sweden. Trains from Stockholm are ferried across the water between Malmö and Copenhagen. Why is the location of Copenhagen favorable to commercial growth? What things have the ships in this view brought to the city? What will they carry away?

Climate. Cold, raw, misty winds bring an abundance of moisture to Denmark, and there is sufficient rainfall for agriculture and stock-raising.

Natural resources and occupations. Four fifths of Denmark is farm land, and about one half of this is being used for pasture. Dairy-farming is the chief occupation of the people. Coöperative creameries have been established by the farmers, and they are carried on most systematically. Large quantities of butter are exported. The skim milk is used for fattening hogs, which are later sent to coöperative packing-houses. The productive land is Denmark's greatest resource, and farming will always be of first importance to the country.

The fishing grounds near Denmark furnish an additional food supply and a profitable occupation for a large number of men. A supply of clay, some of which is of fine quality, is the only valuable mineral resource, and it has led to the manufacture of pottery. The peat of the marshes provides some fuel, but coal is entirely lacking. There are also large plants where engines and steel ships are built, and factories where gloves are made.

Denmark has a large commercial fleet, and many of the people are engaged in the shipping trade.

Copenhagen (trading haven), the capital and the only large city of Denmark, is located on the narrow sound which separates Denmark from Sweden. It commands the important trade route from the Baltic to the North Sea (Fig. 346).

Colonial possessions. Greenland and the Faroe Islands are possessions of Denmark. The Faroe Islands supply the home country with wool and mutton, as well as with large quantities of fish.

Greenland is an ice-capped island. The interior is a vast plateau of ice, 9000 feet high in some places. The ice is probably thousands of feet thick, and moves outward toward the shore, where in some places it breaks off and forms icebergs. It is like the great ice-sheets which were formerly on the North American continent and on northwestern Europe. About the shore of Greenland there is a fringe of old, worn-down mountains. Off the east coast there is a cold current, making the climate so severe that the east coast is not inhabited. On the west coast there is a narrow belt of green tundra country, which explains why the Danish explorer, Eric the Red, who discovered this land, gave it the name "Greenland." The native people are Eskimos. They fish and hunt the seal, walrus, and other fur-bearing animals. The largest settlement is **Julianehaab**, which has a population of 2500.

Problems and review questions. 1. Describe briefly the physical features of Denmark. 2. Why are there not many good harbors? 3. Where is the best harbor in Denmark? 4. With what countries do the Danish people naturally trade and have many interests in common? 5. Why should there be an abundance of moisture in Denmark? 6. Why has dairy farming become the chief occupation of the people? 7. What other occupations are followed? 8. What is the capital and largest city of Denmark? 9. What colonial possessions has Denmark?

Fig. 347. Scattered along the shores of the fiords of Iceland are little fishing villages like the one in this view. Nearly all the people of these villages depend upon fishing for their living. Except for a few small vegetable gardens they do no farming, but most of them own a little live-stock

ICELAND

Iceland was for a long time a colonial possession of Denmark, but in 1919 the mother country granted independence to the people of this island. It is a very large mountainous island with a coast indented by fiords except on the south side. It rises to an elevation of 6400 feet, and the greater part is covered with snow or ice. In the southwest there is a very small lowland area where the few inhabitants live. There are over one hundred volcanoes on the island and many geysers and hot springs. The country is too cold for agriculture, but there are rich pastures where sheep, cattle, and ponies are raised. Fishing also is an occupation followed by many of the people (Fig. 347). Large quantities of down are secured from the eider duck. The capital of Iceland is **Reykjavik**, which is on the western side of the island.

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Fig. 348. This is a typical scene on the polders of the Netherlands. In the distance are the Dutch windmills. In the foreground are a few of the many cattle which feed on the grasses of these fertile meadow lands. Find out what the word "nether" means, and explain why this country is called the Netherlands

THE NETHERLANDS

The Kingdom of the Netherlands is also known as Holland. It is a small country, about the size of Massachusetts and Connecticut combined, but commercially it is very important.

Physical features. The low, marshy lands are the delta of the Rhine. Tidal currents coming from the north and south along the west coast meet opposite the mouth of the Rhine. The water here is therefore almost quiet, allowing the sands and silts brought by the river to settle and make a delta. Elsewhere about the shores of the North Sea the tides rush into the mouths of the rivers and then out again, clearing away the sands and silts. The Rhine has the only large delta in this part of Europe.

Reclaiming the land. A large part of the Netherlands was of little real value to man until the Dutch people constructed strong dikes and sea walls which keep the sea out. They drained portions of the wet meadow land by cutting drainage canals that carried the waters to lower swamps and to lagoons. A number of the meadows were inclosed with dikes, and by pumping the water out they made these meadows fit to cultivate. Little by little Holland has been made into a fertile country, three fourths of which is very productive. Thousands of windmills are still used in pumping the water from the low meadows, or *polders* (Fig. 348), but electric pumps are rapidly replacing the large, picturesque Dutch mills (Fig. 349).

Courtesy of Williams, Brown, and Earle

Fig. 349. A nearer view of a Dutch windmill shows how large these mills are. Compare the size of the mill with the buildings beside it. What use is made of these windmills?

Although the reclaiming of land from the marshes and lagoons has steadily continued, more food-producing land is needed. The privations which resulted from the great World War have spurred the Dutch nation to renew their efforts to drain a large part of the Zuider Zee. The Zuider Zee is an inland body of water so nearly inclosed that it looks like a lake. Plans are now being made for work that will cover a period of thirty years and will reclaim 400,000 acres of land for farming and grazing.

See map on page 171.

Floods. At times the storm waves have succeeded in breaking through the line of dunes that border the coast, and terrible floods have resulted. In many places, however, the sand dunes, where they form a sufficiently broad belt, serve as natural dikes.

Courtesy of Joseph W. Worthen

Fig. 350. Along the shores of the Zuider Zee are little Dutch fishing villages. The fishermen build their trim little houses along the water-front and moor their boats close by. What kinds of fish do the Dutch fishermen catch? Why is the North Sea such an excellent fishing ground?

Natural resources and occupations. About two fifths of Holland is pasture land, and dairy farming has very naturally become the leading occupation (Fig. 348). Butter and cheese are among the chief exports. Excellent breeds of cattle are raised, and large quantities of cottonseed meal and corn are imported to feed the cattle. In this portion of Europe the climate is always mild, and the pastures remain green throughout the year.

There are no coal or iron deposits in this country, and yet, since Holland is so favorably situated in the midst of the densest populations of Europe, manufacturing has become important. Windmills are used to run the machinery in many of the factories and sawmills. Coal and iron are imported from England and Belgium, and raw materials are brought in large quantities from the Rhine valley and from the Dutch East Indies. Sugar refining and the manufacture of cocoa and chocolate have become important in the industrial life of Holland. Great mills for making woolen and cotton goods and for manufacturing linen have been established.

The lowlands contain excellent clays, and Dutch pottery, especially delftware, has become famous throughout the civilized world. The loose, rich soil is excellent for raising flower bulbs, which are exported in large quantities.

Fishing and shipbuilding are also important occupations of the people of Holland (Figs. 350, 353).

Colonial possessions. The Dutch early realized that they had no great natural resources in their country, and many of them followed the sea or became fishermen. When the overland routes through Asia Minor to the Orient were closed on account of troubles with the Turks, the Dutch traders undertook to go around Africa to reach the lands where spices, sugar, and rice could be obtained. They followed the routes of Portuguese explorers and established several colonies among the East Indies. *See Appendix, Plate A.* These islands are now the most valuable Dutch possessions, and four fifths of their trade is with the mother country. *See map on page 260.*

Courtesy of Williams, Brown, and Earle

Fig. 351. This boy is a Dutch street merchant. He harnesses his faithful dog to a little cart, loads it with the baskets containing his wares, and goes through the streets selling them

Courtesy of Joseph W. Worthen

Fig. 352. These Dutchmen are wearing the picturesque native costumes which are now seen only in the small villages. In the cities the people wear clothes very much like our own

Fig. 353. The boys and girls in this picture live in a Dutch fishing village. Their fathers are all fishermen. Notice their wooden shoes and the white caps worn by the little girls

Fig. 354. Rotterdam is a city of many canals. The larger canals are deep enough to allow the passage of the heavily laden ships from the Dutch East Indies. What tropical products do these ships bring to Rotterdam? To what countries are these products exported?

Fig. 355. Amsterdam is also a city of canals. The land on which it is situated is so low and so water-soaked that all the houses are built on piles to keep them from sinking. The canals divide the city into nearly a hundred islands, all connected by bridges

The Dutch also hold a few islands in the West Indies and have a colony on the north coast of South America. Through their efforts to own other lands they now control an area sixty times as great as that of their home country.

Cities. **Rotterdam** is the leading commercial city of Holland. Some manufacturing is done there, and the excellence of the shipping facilities makes it one of the busiest ports in Europe. A great part of the foreign trade of Rotterdam consists in re-exporting the products which come from the East Indies, such as spices, sugar, coffee, and rubber. In addition to its vast overseas commerce it is the natural outlet for the valley of the Rhine (Fig. 354).

Amsterdam, the village built on the dike of the river Amstel, was for three centuries a port of the Zuider Zee and commanded much of the commerce of the Baltic. Its harbor began to fill with sand, and dredging was found to be of no avail, so a ship canal was cut to the North Sea. The Zuider Zee lost its commercial importance, and Amsterdam became a North Sea port (Fig. 355). It is an important banking and manufacturing center and is particularly noted for its diamond-cutting industry. Between Rotterdam and Amsterdam is **The Hague**, the capital of the kingdom. **Leiden** has a large publishing trade. **Utrecht**, the chief inland town, is an important railroad junction.

Fig. 356. The city hall at Brussels faces the market place. The part of the building which can be seen in this view was completed nearly fifty years before Columbus discovered America

BELGIUM

Belgium has twenty times as many people per square mile as has the United States, and is the most densely populated country in Europe. With England's busy mines and factories to the west, the industrial portions of Germany and northern France to the east and south, and commercial Holland to the north, Belgium is in the heart of industrial Europe.

Physical features. This country is smaller than either Holland or Denmark. It contains about 11,700 square miles, which is a little less than the area of the state of Maryland.

Along the coast there is a belt of sand dunes, and offshore the waters are shallow. The lowland of Belgium is a part of the Central Plains of Europe, which widens southward into France and eastward into Germany. It is an agricultural land. The upland area in the southeast is a part of the Central Highlands. The elevations here reach to about 2000 feet, and on the hills there are pastures and forests.

Climate. The climate is much like that of southern England, with cool summers and mild winters. Since the hills are on the eastern side, the effect of the moist winds from the ocean is felt throughout Belgium, and the rainfall is greater than that of Germany and the countries farther east on the continent.

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Fig. 357. The rich pasture lands of Belgium have made it possible for the people to raise the finest draft horses in the world. What other kinds of live-stock do the Belgians raise?

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Fig. 358. These men are putting bundles of flax to soak in the river Lys. This soaking process, which is called *retting*, separates the flax fiber from the softer parts of the stalk

Fig. 359. Belgian dogs are wonderfully intelligent. This dog is his mistress's faithful helper, drawing her cart through the streets every day as she delivers milk to her customers

Natural resources. The soils of the lowlands and the timber and pastures of the uplands are valuable resources. Belgium is also fortunate in having a remarkable network of navigable streams connected by canals.

The coal located near the French border is the principal mineral resource. Farther east, iron and zinc have been found. The local iron supply is nearly exhausted, and iron is now imported for the modern industrial plants. There are beds of excellent sands along the seacoast, which have led to the growth of large glassworks.

Occupations. The farms of Belgium, although usually small, are very carefully cultivated. The principal crops are grains, flax, hemp, fruit, and sugar beets. Sheep-raising is a second important occupation of this country.

More than half of the people are engaged in farming or in the care of stock (Fig. 357). It is impossible, however, to produce in Belgium enough food for so large a population, and large numbers of people are engaged in commerce in order to bring the necessary food and raw materials into the country.

Coal-mining and the manufacturing of cotton, wool, linen, iron, steel, and glass occupy the time of another very large portion of the population.

Belgium produces much of the world's best linen. Some of the flax is grown at home, but much of it is imported. The waters of the Scheldt and the Lys have been found excellent for retting and bleaching the flax (Fig. 358), and the moist climate, due to the westerly winds, is especially favorable for handling the flax in the process of spinning.

Courtesy of Joseph W. Worthen

Fig. 360. This is the famous old belfry at Bruges, in Belgium. It is older, even, than the City Hall of Brussels. In the belfry are some beautiful chimes which visitors always wish to hear

Cities. **Antwerp**, near the mouth of the Scheldt, is the great seaport of Belgium and is connected by railroads and canal systems with all parts of the country (Figs. 361, 363). **Brussels**, the capital of the kingdom, located in the central part, is a city of beautiful buildings and modern streets (Figs. 356, 362). It has become the leading market for the laces and gloves made in Belgium.

Near the eastern margin of Belgium is the city of **Liège**. It is the chief industrial center of Belgium. The most important manufactured articles are firearms, cutlery, glass, and many kinds of machinery. **Ghent** is the center of the textile industries. Large quantities of cotton and woolen goods are manufactured here.

Colonial possessions. Belgian Congo, in central Africa, is a state of Belgium and a very valuable possession. It exports each year great quantities of gold, copper, and other minerals, as well as large supplies of crude rubber, palm nuts, palm oil, and ivory (p. 229).

Problems and review questions. 1. Describe briefly the physical geography of Holland. 2. Tell how the Dutch have reclaimed for agriculture lands that were covered by the sea. 3. How do the people of Holland make use of the winds? 4. Why should dairy farming be so profitable in the Netherlands?

5. Explain how Holland has become an important manufacturing country. 6. Where are the colonial possessions of the Dutch people? 7. What are the important seaports of Holland? 8. What is the capital of Holland?

9. Describe the physical features of Belgium. 10. Why has Belgium become an important industrial center? What are the chief manufactures? 11. Name the capital and the chief seaport of Belgium.

LUXEMBURG

The duchy of Luxemburg is located in the Central Highlands of Europe and just southeast from Belgium. It is a small country of about 1000 square miles. Iron ore is abundant, and this has led naturally to mining, smelting, and some manufacturing. The hilltops are in part forested, but in the valley bottoms and on the lower, gentler slopes the lands are cultivated.

Luxemburg is the capital and chief city of the duchy.

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Fig. 361. This is a view along the wharves at Antwerp. At the right is the old castle of Antwerp, called the Steen. The mouth of the river Scheldt has been deepened to admit large ocean vessels, making Antwerp one of the chief ports of Europe. What are the exports and imports of Antwerp?

MAP STUDIES

(Use map between pages 181 and 184)

1. Prepare the following table, which shall have four columns: In the first column place the names of the countries entirely included within the area of this map; in the second column, opposite the names of the countries, write the names of their chief seaports; in the third column, opposite the names of the chief seaports, place the name of the river on which each port is located; in the fourth column write the name of the capital of each of the countries.

2. What seaport serves Paris? 3. With what countries is most of the trade of that port carried on? 4. Judging from the exports from Bordeaux, what should you think are the leading occupations of the people in southern France?

5. In which country is a part of the land below sea level and not covered by water? The dotted area northeast of Amsterdam shows the land that the Dutch people are planning to reclaim from the Zuider Zee.

6. Judging from the products in the Netherlands, what should you think are the chief occupations of the people in the country districts? 7. In what portion of Germany are the coal and iron deposits? 8. Where are the supplies of potash in Germany? 9. What seaport serves Berlin best throughout the year? 10. Describe the location of the Kiel Canal.

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Fig. 362. This is the *Palais de Justice* (Palace of Justice) in Brussels. It is a very large modern building, in contrast to the many very old buildings which the city contains. Judging from its name, what use do you think is made of this great building?

11. What inland water route could you follow from Rotterdam to Marseille? 12. Describe an inland water route from Havre to Bordeaux by way of Lyon. 13. Describe the inland water route from Rotterdam to Vienna. If you went on down the Danube, what capital cities should you pass? To what sea should you finally come?

14. Describe an inland water route from Hamburg, through Berlin, to Warsaw. 15. Judging from the products of Poland, what must be the occupation of most of the people? 16. In what part of Poland is there a supply of coal? 17. What geographic advantages has the location of Prague? 18. What resources are found in the mountains of Austria?

19. Judging from the chief products of Hungary, what should you think is the principal occupation of the people in that country? 20. What advantage can you see in the location of a seaport as far inland as ocean vessels can go? 21. What seaports in Europe clearly illustrate this advantage?

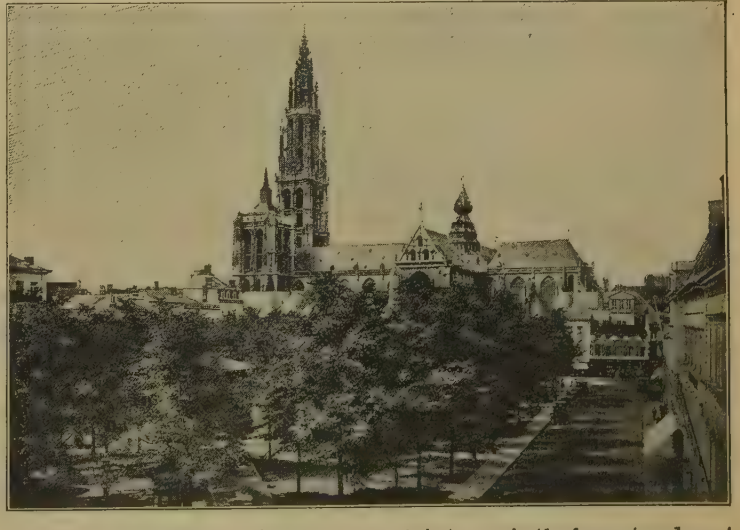

Fig. 363. The Cathedral of Notre Dame at Antwerp is the largest and most beautiful church in the Low Countries. It contains many beautiful paintings. Among them are the original works of some of the greatest European painters. For many years Antwerp has been the center of Belgian art

Fig. 364. This is a view of part of the harbor of Dunkirk on the northern coast of France. Dunkirk has extensive wharves and docks and has become the chief importing center for the raw materials that are needed for the industrial district of northern France. It is also the principal exporting point for the manufactured goods of this district. How should you describe the surface of the land here? Locate Dunkirk on the map on page 171. In what natural region is it situated? Explain how the geographical location of Dunkirk has influenced its development as an industrial port

FRANCE

Physical features. *Use map on page 161.* There is no natural division between Belgium and France; it is a purely political line. The lowland plain of Belgium continues southward, widening to include the Paris Basin, and farther south widening again in the valley of the Garonne.

The uplands of southeastern Belgium continue into northern France and are connected by a narrow upland belt with the Central Plateau of France.

The Upland of Brittany is a hilly region. It is an old, worn-down mountain country. The Vosges Mountains in eastern France are an old, worn-down range. Farther east are the rich lowlands in the valley of the Rhine. The part of these lowlands that is west of the Rhine belongs to France. South of the valley of the Garonne are the young and rugged Pyrenees Mountains that form the boundary between France and Spain. In the southeast beyond the valley of the Rhône are the Jura and Alps.

MAP STUDIES

1. *Use map between pages 181 and 184.* Locate the uplands of Brittany. 2. Locate the lowland of the Saône-Rhône valley. 3. Where are the Jura Mountains of France?

4. The boundary line between France and Italy is along the crest of what mountain range? How high is Mt. Blanc? In what country is it located? 5. The boundary line between France and Spain is on the crest of what mountain range?

6. Locate the Vosges Mountains and determine whether or not they are forested. *See map opposite page 216.* These mountains rise over 5000 feet above sea level, and yet they are only the stumps of mountains which were formerly lofty peaks.

7. Locate the Central Plateau of France. In this region great volcanoes broke forth many years ago and built up cones, some of which rise to elevations of 6000 feet above the sea. Floods of lava have come from these volcanoes and flowed out over the surrounding country.

8. What part of the lowland of the middle Rhine belongs to France? 9. What river systems have been connected by canals? More than half of France is less than 600 feet in elevation. This has made the building of roads, canals, and railways relatively easy.

10. The sinking of western Europe, which also affected England and Scandinavia, caused the drowning of the mouths of the French rivers which flow into the English Channel and the Bay of Biscay. Make a list of the large estuaries along these shores. 11. What state in the United States is of about the same size as France?

Climate. The winds from the Atlantic Ocean bring moisture and also help to prevent great extremes in temperature in France. Since the higher lands are not near the coast, the effect of the winds is felt far inland. In no part of France except on the high mountain peaks is there a long period of winter frost, and only in the south, which has a Mediterranean climate, are the summers very hot.

The annual rainfall over most of France is about 30 inches, which is enough for agriculture. The heaviest rainfall, about 70 inches, is received in the western part of the Pyrenees. In the higher parts of the Central Plateau and in the Vosges Mountains about 60 inches of rain falls each year. Western and northern France receive rain during each month, but in the area bordering the Mediterranean the summers are dry and the rain comes during the winter.

THE NEW FARMING IN THE OLD WORLD

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Fig. 365. This French farmer and his boys have harvested their wheat and brought it in from the fields. One by one the bundles are put through the threshing machine, which is turned by hand

Courtesy of Williams, Brown, and Earle

Fig. 366. This French woman of Brittany is busy mending one of her husband's fishing nets. What kinds of fish are caught in these nets? What are other occupations of the people of Brittany?

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Fig. 367. Along the Brittany coast many acres of tidal flats are used for raising oysters. The flats are divided into square beds where the oysters are planted and grown for the Paris market

Natural resources. France is a land of much variety but without great wealth in mineral resources. There are coal and iron fields in the north along the Belgian border and in Lorraine, and France owns the coal mines in the Sarre valley. *See map on page 171.* There is also a good supply of coal and iron in the eastern part of the Central Plateau near St. Etienne. These resources have naturally encouraged manufacturing and have given rise to important industrial centers. Water-power from the Vosges, the Jura, and the Alps is of great value in the industrial development. The soils are fertile, and the broad lowland areas have helped to make France an agricultural country.

The rivers have furnished an easy and cheap means of transportation, and France's position, bordering on three important seas, affords distinct advantages for the development of foreign commerce.

Home work. 1. Find out all you can about the life of the French peasants. 2. Ask some acquaintance who was a soldier in France to tell you of the country and of his experiences with the French people.

Occupations. The mining and manufacturing in northern France have led to the growth of several industrial centers. In **Lille, Valenciennes, St. Quentin,** and **Amiens** woolen, cotton, and linen goods are manufactured. **Dunkirk** is the French outlet for this industrial district (Fig. 364). On the coast are the fishing towns of **Calais** and **Boulogne**; these towns are also stations for the channel boats.

In the vicinity of the Vosges, where there is water-power and easy communication with coal fields, the manufacture of cotton has been promoted. Lorraine is the leading cotton-manufacturing center of France. Much of the cotton is brought from the United States and carried far up the Seine and thence by canals to the manufacturing towns.

Some of the cities located on the larger navigable streams of the lowlands (notably Paris and Rouen) are important manufacturing centers. Raw materials and coal are easily brought to those cities.

The broad, open lowlands of the Paris Basin are used for agriculture. Here it has been possible to raise a large part of the wheat needed by the French people (Fig. 365). Many other cereal crops and large quantities of sugar beets and flax are also raised here.

Over half of the population of France is engaged in agriculture. Those who do the farming commonly own their farms but do not live on them. They live in small villages and each morning walk out perhaps two or three miles to work. They are a happy people, who enjoy their work in the fields and also the social side of village life.

In the uplands of Brittany the soil conditions are not very favorable to agriculture. Dairy-farming, market-gardening, and sheep-raising are commonly carried on. Along the coast fishing is the usual occupation of the people (Figs. 366, 367). In the highlands the quarrying of granite, for use as building stone, is of importance.

The Central Plateau is far enough south so that the lower slopes can be used for the cultivation of grapes, and the manufacture of wine is carried on here. The high tracts of poorer land are used for the grazing of cattle, sheep, and goats.

CENTRAL EUROPE
POLITICAL AND ECONOMIC MAP
Scale of statute miles
Scale of kilometers
Capitals of countries
Chief seaports
Principal railroads
Navigable rivers
Principal canals
Land below sea level
Uplands and plateaus
Lowlands
Old, worn-down mountains
Young, rugged mountains
Settled boundaries
Unsettled boundaries
ATLANTIC OCEAN
ENGLISH CHANNEL
NORTH SEA
IRISH SEA
BAY OF BISCAY
SCOTLAND
IRISH FREE STATE
ULSTER
FRANCE
BELGIUM
NETHERLANDS
GERMANY
SWITZERLAND
LUXEMBURG
Edinburgh
Berwick
Dumfries
Newcastle upon Tyne
Sunderland
Middlesbrough
Carlisle
Scarborough
Lancaster
Preston
Leeds
York
Hull
Liverpool
Manchester
Sheffield
Chester
Nottingham
Derby
Stoke on Trent
Shrewsbury
Leicester
Birmingham
Wolverhampton
Worcester
Northampton
Norwich
Great Yarmouth
Cambridge
Ipswich
Gloucester
Oxford
Harwich
London
Bristol
Bath
Swansea
Cardiff
Pembroke
Exeter
Plymouth
Falmouth
Lands End
Portsmouth
Brighton
Hastings
Dover
Canterbury
Greenwich
Margate
Southampton
Harwich
Belfast
Londonderry
Donegal Bay
Sligo
Killala
Westport
Galway
Dublin
Kingstown
Holyhead
Drogheda
Dundalk
Armagh
Antrim
Malin Head
Limerick
Kilkenny
Waterford
Wexford
Tralee
Killarney
Cork
Cobh (Queenstown)
Old Kinsale Head
Dunmore Head
Valencia I.
Shannon R.
Dingle Bay
Blackwater R.
Lough Erne
Lough Neagh
Lough Ree
Galway Bay
Dungarvon
Tramore
Cardigan Bay
Bristol Channel
St. George's Channel
Irish Sea
Isle of Man
Douglas
Solway Firth
Tweed R.
Humber R.
The Wash
Flamborough Head
Isle of Wight
Calais
Boulogne
Ypres
Ostend
Bruges
Flushing
Ghent
Antwerp
Brussels
Cologne
Aix-la-Chapelle
Liège
Namur
Spa
Malmedy
Koblenz
Trier
Luxemburg
Metz
Verdun
Nancy
Strasbourg
Lille
Roubaix
Douai
Arras
Valenciennes
Mons
Maubeuge
Cambrai
Bapaume
Abbeville
Dieppe
Amiens
St. Quentin
La Fère
Compiègne
Soissons
Reims
Château-Thierry
Epernay
Châlons-sur-Marne
Mézières
Sedan
Longwy
Briey
Havre
Rouen
Elbeuf
Caen
St. Lô
Cherbourg
Cape la Hague
Channel Is. (British)
St. Helier
St. Malo
Granville
Brest
Pt. St. Mathieu
St. Brieuc
Pt. Penmarch
Lorient
Vannes
Quiberon B.
Belle Ile
St. Nazaire
Nantes
Rennes
Laval
Le Mans
Alençon
Chartres
Fontainebleau
Melun
Paris
Versailles
St. Germain
St. Denis
Troyes
Sens
Montargis
Orléans
Auxerre
Tours
Blois
Briare
Angers
Loire R.
Seine R.
Marne R.
Meuse R.
Moselle R.
Saône R.
Rhône R.
Dijon
Besançon
Belfort
Langres
Nevers
Bourges
Châteauroux
Châtellerault
Poitiers
La Rochelle
Niort
Oléron
Rochefort
Limoges
Angoulême
Périgueux
Libourne
Bordeaux
Bergerac
Aurillac
Cahors
Agen
Montauban
Albi
Toulouse
Pau
Tarbes
Lourdes
Carcassonne
Narbonne
Perpignan
Bayonne
Biarritz
San Sebastian
Bilbao
Vitoria
Pamplona
Ebro R.
Pyrenees Mts.
Andorra
Gulf of the Lion
Mouths of the Rhône
Marseille
Toulon
Hyères Is.
Nice
Grasse
Aix
Arles
Avignon
Montpellier
Béziers
Nîmes
Alais
Valence
Grenoble
Lyon
Roanne
Clermont-Ferrand
Mâcon
Chalon-sur-Saône
Le Creusot
Montluçon
Moulins
Mont Blanc 15,780
Mont Cenis
Turin
Digne
Cannes
Monaco
Geneva
Lausanne
Lake Geneva
Lake Neuchâtel
Berne
Basel
Zürich
Lake Constance
Rhine R.
Mont Dore
Auvergne Mts.
Cévennes Mts.
Alps
Helder
Texel I.
Groningen
Haarlem
Amsterdam
Utrecht
The Hague
Rotterdam
Arnhem
Münster
Dortmund
Duisburg
Crefeld
Aachen
Maastricht
Zuider Zee
Frisian Is.
Dollart
Ems R.
Weser R.
Elbe R.
Hamburg
Bremen
Hanover
Kiel
Helgoland
Cotton, coal, wool, wheat, hides, coffee, rubber from U.K., U.S., S.A., Asia, Australia
Textiles, lumber, coal, machinery, hides & skins, sugar from United Kingdom, United States and Java
Wool, cotton, grain, coal, wood, diamonds, ivory from U.K., U.S., S.A. and Africa
Wheat, cotton, meat, copper, wood, furs from United States and Canada
Coffee, hides, rubber from South America
Wool, hides, sugar, coffee, copper, nitrate from South America and Mexico
Gums, nuts, ivory, rubber from Africa
Raw silk, tea from Africa, Russia and Australia
Wool and wheat from Africa, Russia and Australia
Herring
Haddock
Cod
Oats
Wheat
Potatoes
Sugar beets
Flax
Barley
Rye
Cattle
Sheep
Fruits
Iron
Coal
Lead, wool, machinery, tin
Textiles, coal
Wines, silks, cottons, coal to Africa
Longitude 12° West from Greenwich
Longitude 2° East from Greenwich
Gold Coast
Faroe Islands
Bergen
Morocco
Gibraltar
Winnipeg
Quebec
Montreal
Halifax
Boston
St. Johns, Newfoundland

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Fig. 368. This is a thriving silk-manufacturing town southeast of Lyon. It is situated on the western edge of the highlands. The long, low buildings in the foreground are the silk mills. Why has this district become an important silk-manufacturing center? Where does the raw silk come from?

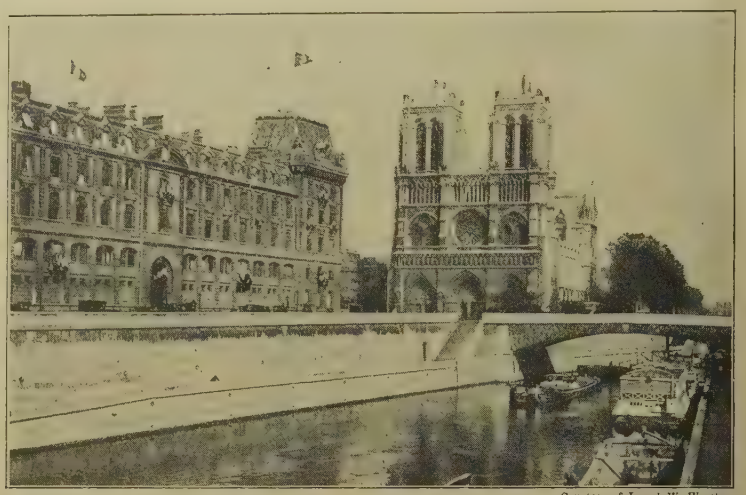
Near **Limoges**, on the western slope of the plateau, there are excellent clays, which have led to the manufacture of china. In the eastern part of the Central Plateau, between the Loire and the Rhône, where coal and iron have been found, there is an industrial center. The best French steel is produced in the region of **St. Etienne**. Large quantities of raw silk are easily brought from the Rhône valley, and silk goods and ribbons are manufactured here on a large scale. A little farther north, in the valley of the Loire, is a center for the manufacture of cotton and woolen goods.

The lowland of the Garonne valley is another agricultural district where wheat and maize are raised. The grapevine flourishes in this warmer climate, and great quantities of wine are shipped from Bordeaux to various parts of the world.

Southern France has the Mediterranean climate, and here, in addition to the grapevine, the people cultivate the olive, plum, walnut, and, in some parts, orange and lemon trees. The mulberry is raised for the silkworm, and Lyon has become one of the most important centers in the world for the manufacture of silk goods (Fig. 368). Some of the silk used at Lyon is produced in the Rhône valley, but the home supply is not nearly enough. Great quantities of raw silk are imported every year from Italy, China, and Japan.

Fig. 370. The wharves at Marseille are always crowded with freight. Some of the goods are imports which will be sent by train to different parts of France. Others are exports ready to be loaded on ships for various parts of the world. Name some of these goods

In the Alpine district the soils are poor, the fields are very limited, and the climate is not suitable for growing cereals; but cattle, sheep, and goats are raised, and manufacturing has been undertaken. Water-power, which the French call white coal, is abundant in this part of the country and has helped the cities near the high mountains to develop into manufacturing centers of importance.



Courtesy of Joseph W. Worthen

Fig. 369. The building with the two towers is the Cathedral of Notre Dame in Paris. It is situated on the small island in the Seine where the first settlement of Paris was made. Find its location in Fig. 371. The construction of this cathedral was begun over seven hundred years ago

Principal rivers and cities. The navigable rivers of the world have always been great highways of travel, and most of the large cities of the world have developed near those rivers. By far the greater number of the large cities of France are located on the waterways.

Paris, the capital of the French republic, is a very beautiful city, with broad boulevards and numerous buildings of unusual interest (Figs. 369, 371). In its great museums are many of the world's most precious works of art. This city is located on the Seine and is in the midst of a rich agricultural country. It is also on the highway of travel from the Mediterranean countries northward through the valley of the Saône-Rhône system and down the valley of the Seine. Paris is an important railroad center and is also a port for the smaller ocean-going vessels.

Many different industries were established here because it was easy to bring in raw material and to distribute manufactured goods from this center.

Picture study. Fig. 371. 1. On what river is Paris situated? 2. How should you describe the country surrounding Paris? 3. What river joins the Seine southeast of the city? 4. What can you tell about the Marne? 5. Notice the ring of forts which surrounds Paris. How many forts are there? These forts, like the wall, were built many years ago, when it was believed that every great city should be strongly protected against attack. To-day they have no military value. 6. Find the Bois de Boulogne. "Bois" is the French word for *forest*. The Bois de Boulogne (Forest of Boulogne) is a beautiful wooded park. Among the Parisians it is a favorite spot for walking, driving, and horseback riding.

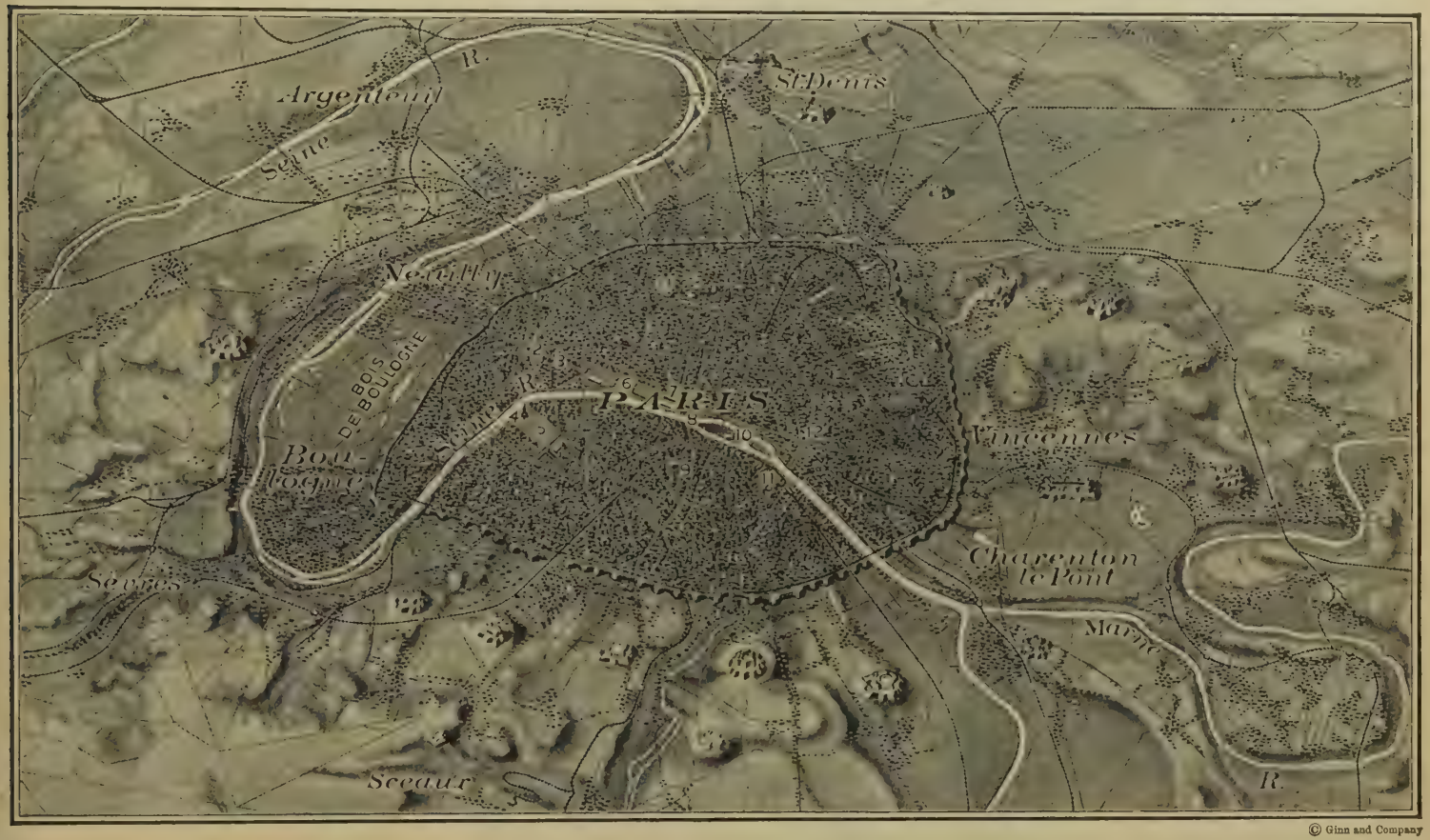


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Fig. 371. This is an aëroplane drawing of Paris and its surroundings. The numbers indicate the location of the following places of interest: 1, Montmartre; 2, Arc de Triomphe; 3, Avenue des Champs Élysées; 4, Eiffel Tower; 5, Champ-de-Mars; 6, Place de la Concorde; 7, Palais des Tuileries; 8, Louvre; 9, Palais du Luxembourg; 10, Notre Dame; 11, Jardin des Plantes; 12, Place de la Bastille. The first settlement of Paris was made on the island in the Seine where the Cathedral of Notre Dame now stands. Notice the wall which surrounds the city. It was built many years ago in the days when cities were walled for safety against the attack of enemies. It is now being torn down, and in the future its site will be marked only by a boulevard

Bordeaux is another city at the head of an estuary. In addition to being a port for the shipment of wine it is an important manufacturing center.

Lyon has been referred to as a leading city in the manufacture of silk; it is one of the important cities on the Rhône. At the mouth of this river is **Marseille**, one of the largest ports on the Mediterranean. It is an ancient city which has grown so rapidly of late years that its harbor facilities have been greatly increased to accommodate the vessels which come there (Fig. 370). **Grenoble**, the largest city in the French Alps, is an industrial center and the market for the gloves manufactured in many of the neighboring villages.

East of Marseille, on the Mediterranean coast, is **Toulon**. The coast beyond there is commonly known as the Riviera; it is a region of great beauty, with a delightful winter climate. The city of **Nice** is a noted health resort on the Mediterranean coast (Fig. 373). At **Grasse** a large part of all the flower perfumery used in the world is made. On the hillsides roses and other flowers are raised, and the perfumery is made from the oil which is pressed from the blossoms.

Rouen, below Paris on the river Seine, is a center for cotton-manufacturing. The largest ocean steamers ascend the river to this point. At the mouth of the estuary is **Havre**, the "haven," or port, of Paris. Here there are over eight miles of quays, and a flourishing trade is carried on with the chief seaports of the world.

Along the Loire, which is the longest river in France, Orléans, Tours, and Nantes are located. **Nantes** is at the head of the estuary of the Loire and serves as a seaport. **Orléans** and **Tours** are small manufacturing cities.

On the banks of the Garonne are Toulouse and Bordeaux. **Toulouse** is in the midst of good farming country. It is connected by a canal with the Mediterranean Sea.

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Fig. 372. Strasbourg is the chief city of Alsace, one of the provinces lost by France in a war with Germany many years ago, and restored to France at the end of the World War in 1918. This view shows one of the public squares in Strasbourg. In what lowland is the city located?

Colonial possessions. Like most of the countries of western Europe, France has sent expeditions to various parts of the world and helped to colonize distant lands. In Africa her possessions include Algeria, Tunis, the protectorate of Morocco, a large part of the Sahara, the Sudan, and the Gulf of Guinea coast, part of Somaliland, and the islands of Madagascar and Reunion. France also controls French Indo-China, five cities in India, and French Guiana in South America. The islands of St. Pierre and Miquelon off the shore of Newfoundland, a few small islands in the West Indies, and a few in the Pacific Ocean also belong to France. Several of the colonies send representatives to the French parliament, and Algeria is treated in many ways as a part of France.

The colonies furnish markets to which the manufactured goods from the French factories can be sent, and in return the French receive large quantities of raw material and certain tropical foods which they cannot raise in their own country.

Home work. 1. On an outline map of the world, color in the colonial possessions of France. 2. Mark the chief lines of travel between these colonies and the home country. *See Appendix, Plate B.*

The **Sarre Basin** is a small area lying in the valley of the Sarre River. It is very important because of the rich beds of coal which it contains, and before the World War it belonged to Germany. France now owns the coal supply, but in 1934 the people of the area will decide by vote whether it shall be under the political control of France or Germany. At present it is governed by a commission appointed by the League of Nations.

Government. France is organized as a republic. The chief executive is the president, who is elected for seven years. The legislative power is in the hands of a Chamber of Deputies and a Senate.

Problems and review questions. 1. What natural regions of Europe extend into France? 2. What advantage is it to the country to have the highlands and mountains in the east rather than in the west? 3. In what part of France are the chief coal fields? 4. In what part is the water-power most abundant?

5. On what seas does France border? 6. Why should farming be one of the chief occupations of the French people? 7. In what parts of France are the growing of grapes and the manufacture of wine especially important? 8. From what port is much of the wine shipped?

9. Of what advantage to France is a Mediterranean seaport? 10. Name five large cities in France and explain the location and growth of each. 11. Explain why so many of the larger cities are on the rivers. 12. In which continent are most of the colonial possessions of France located? 13. Of what value are they to France?

Courtesy of Williams, Brown, and Earle

Fig. 373. This is a view of the harbor of Nice on the Riviera coast of France. Besides being a popular health resort Nice is also a port of some importance. Here on the wharf are barrels of olive oil and wine ready to be shipped away. Many people from northern Europe go to Nice each winter to enjoy the mild climate and the clear blue skies, just as people from the cooler parts of the United States like to spend their winters in the warmer parts of the country. Locate Nice on the map between pages 181 and 184. Can you explain the mildness of the climate in the winter months on this Riviera coast?

SWITZERLAND

In the high mountains east of France and south of Germany, among most beautiful surroundings, live the Swiss, a strong, brave, liberty-loving people. Their land is without large mineral resources, without broad fields for agriculture, and without any coast line; yet Switzerland has become one of the most prosperous of the small nations. Because of the wonderful mountain scenery afforded by the Alps, Switzerland is probably visited by more travelers from foreign lands than any other country in the world.

Fig. 374. This is a view among the high summits of the Alps, where there is snow throughout the entire year. Can you explain why the snow does not melt here in summer? Are the Alps old, worn-down mountains or young, rugged mountains? What other mountains of Europe are of the same type as the Alps? What is the highest peak in the Alps?

Physical features. The Jura mountains extend into the northwestern part of Switzerland, and in the southeast are the lofty peaks of the Alps. Between these two mountain ranges there is a narrow plateau belt where there are many hills and many beautiful lakes (Fig. 375).

The Alps rise to elevations of from 10,000 to 15,000 feet above sea level. Among their summits snow remains throughout the year, and little by little the snow-fields become so thick that ice forms at the bottom and moves down the valleys as glaciers (Fig. 374). These Alpine glaciers freeze about the stones and loose material beneath them on the canyon floors, and shod with such sharp tools they deepen the canyons and gouge out great basins as they move forward. Stones and soil rattle down the mountains and come to rest on the top of the ice.

When northwestern Europe was covered by a great ice-sheet, the glaciers in Switzerland were much longer than they now are. They extended through the canyons in the mountains to the plateau country northwest of the Alps and southward beyond Switzerland to the plain of northern Italy.

Fig. 375. Lake Geneva is one of the several beautiful lakes which occupy the plateau between the Alps and the Jura Mountains. This view was taken from the hill overlooking Montreux, a city located at the eastern end of the lake

At the same time that the continental ice-sheet melted away, the mountain glaciers became shorter. They left sand, gravel, and bowlders strewn on the surface where they had rested. Some of this material blocked the drainage and thus formed beautiful lakes high in the mountains (Fig. 375). A number of the rock basins which were gouged out by glaciers also contain lakes. Almost all of the soil of Switzerland is of glacial origin.

Climate. Because of the altitude of Switzerland there are heavy rains and heavy snowfalls and no very warm weather. The slopes that face to the south are much warmer than those that face to the north. The summer climate attracts many visitors who are looking for a cool region, while the winter climate calls those who enjoy the brisk, cold air and the skating, tobogganing, and skiing.

Natural resources and occupations. There is not much agricultural land in Switzerland, but the small areas that are suitable for agriculture are cultivated intensively. The steep, sunny hillsides are terraced and used for raising grapes. Many of the Swiss people have taken up dairying, and each summer they send their cattle, sheep, and goats high into the mountains in order to save the grass which grows in the valleys for hay (Fig. 376). The young boys of the family often go with the stock to these high pastures, called *alps*, and remain there until fall, caring for the animals and making the butter and cheese (Fig. 379). The flocks and herds are brought to the lower lands for the winter, and the return to the home is accompanied by great rejoicing. It is a festival time, when friendships are renewed after a long period of separation.

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Fig. 376. This Swiss farmer is hauling home a load of hay which he has cut in one of the mountain valleys. The hay will be used to feed his cattle during the winter months

© Keystone View Co.

Fig. 377. The Swiss wood-carvers are very skillful. This man is carving little models of animals from solid blocks of wood. Why have the Swiss developed so many home industries?

© Donald McLeish, London

Fig. 378. Here is a Swiss peasant with his alpenhorn. Years ago these great horns were blown to sound the charge in battle, but now they are used to call the cattle from the pastures

Besides the butter and cheese made from the milk of the cows and goats the Swiss people produce large quantities of condensed milk and manufacture milk chocolate for export. The skins of the goats and kids are used in the manufacture of gloves.

Coal is not found in Switzerland, but the forests yield abundant fuel and also huge logs for timber and for building homes (Fig. 380). Most of the forests are national reserves, controlled by the government as the national forests in the United States are. The plentiful supply of hard woods has led many of the people to take up the art of wood-carving, for which they have ample time during the cold winter months (Fig. 377).

Water-power is abundant, and Switzerland has long been famous for the manufacture of small, light articles which can be easily transported, such as jewelry, lace, toys, watches, and clocks. The water-power is now transformed into electricity and used in cotton and silk mills.

The Swiss have undertaken another remarkably profitable industry in which they use electricity. They have learned to take nitrogen from the air and make a fertilizer which is sold to the neighboring agricultural peoples in large quantities. This was very clever of the Swiss people, for there is plenty of air, and plenty of power, and plenty of limestone, which is used in making this fertilizer. Other people also make a fertilizer in this way.

The caring for travelers gives occupation to many of the inhabitants. Where travel was at first very difficult the Swiss have built excellent roads or trails. Hotels and resting places have been built high among the mountains, and every arrangement is made for the comfort of the traveler. Special guides are supplied to those who wish to cross the glaciers or climb the high peaks.

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Fig. 379. Here are some of the Swiss dairy cattle grazing over an upland pasture. At what season of the year do you think this picture was taken? Why has dairying become an important Swiss industry?

Government. The Swiss have a republican form of government, and each of the twenty Swiss cantons, which are political divisions somewhat like our states, sends representatives to the national congress. Switzerland is one of the oldest republics in the world.

Cities. **Bern**, the capital, has a picturesque location on a bluff, about the base of which flows the river Aar. Its old fortifications have been transformed into promenades, which command wonderful views of the snowy Alps. **Zürich** is the largest city and an important railroad center, where connections are made for France, Austria, and Germany, and by way of the St. Gotthard tunnel for Italy. It is also a center for the manufacture of cotton and silk and of textile and electrical machinery. **Basel** is the second largest Swiss city. Its ribbon manufacture is important. Merchandise from all parts of central and northern Europe is brought here for shipment over the St. Gotthard railway to Italy and to the Balkan States. **Geneva**, beautifully located at the lower end of Lake Geneva and near the point where the Rhône enters France, is an educational and industrial center. Jewelry and scientific instruments are manufactured here on a large scale. Geneva has long been famous for its watches and clocks. Formerly these were made by hand, but now they are made by machinery.

Problems and review questions. 1. What countries border Switzerland? 2. Name two rivers of commercial importance that rise in the Alps of Switzerland. 3. What disadvantages do the Swiss people have to contend with? 4. What is the local supply of fuel in this country?

5. Why should water-power be so abundant in this country? 6. Why have the Swiss people engaged in manufacturing small, light articles? 7. Tell something of interest about each of the four leading cities of Switzerland.

8. How do the many visitors to Switzerland help the country? 9. What advantages would there be in visiting this country during winter? during summer? 10. What do you suppose the children of Switzerland do for recreation?

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Fig. 380. The streams that tumble down the mountain sides in Switzerland provide a large amount of water-power. The waterfall in this view is being used to run a small sawmill, where the logs which are cut on the mountain slopes are sawed into boards. For what other purposes is the water-power used in Switzerland?

Home work. 1. Read the story of William Tell. 2. Look up the names and descriptions of the great tunnels through the Alps.

GERMANY

Natural regions. Germany includes parts of four natural regions: (1) a broad stretch of the Central Plains of Europe, which is here often called the Plain of North Germany; (2) a large portion of the Central Highlands, where there are many old, worn-down mountain ranges; (3) some of the rich Middle Rhine Plain; and (4) a small portion of the northern slope of the Alps. The coast line is low and sandy and offshore the waters are shallow.

Waterways. Germany is fortunate in having access to the North and Baltic seas and in having a remarkable system of inland waterways. The Rhine rises in the Alps, flows through the fertile lowland of its middle course and the beautiful gorge in the Central Highlands, and then crosses the open lowlands of western Germany.

The Weser, Elbe, and Oder rise in the Central Highlands and flow northward across the lowland plain of Germany. The first two flow into the North Sea, but the Oder reaches the Baltic. Each of these three rivers has a broad estuary, or drowned mouth, which has made it possible for ocean-going vessels to go far inland. The cities of **Bremen, Hamburg** (Fig. 381), and **Stettin**, at the heads of these estuaries, while enjoying all the advantages of inland positions, are thus important seaports.

There are 1500 miles of canals in Germany (*see map between pages 181 and 184*), and with the rivers they make a network of water routes that furnish a cheap means of transportation throughout the lowland country. From the Rhine a boat may pass by means of canals into the Danube. From the Elbe it is possible for a boat to pass to the Vistula, and then to the Black Sea.

Fig. 381. This is a view along one of the canals in Hamburg, the second city and chief port of Germany. Locate Hamburg on the map on page 171. How has its location led to its development as a great commercial city? What landlocked nation of central Europe may use Hamburg as a seaport?

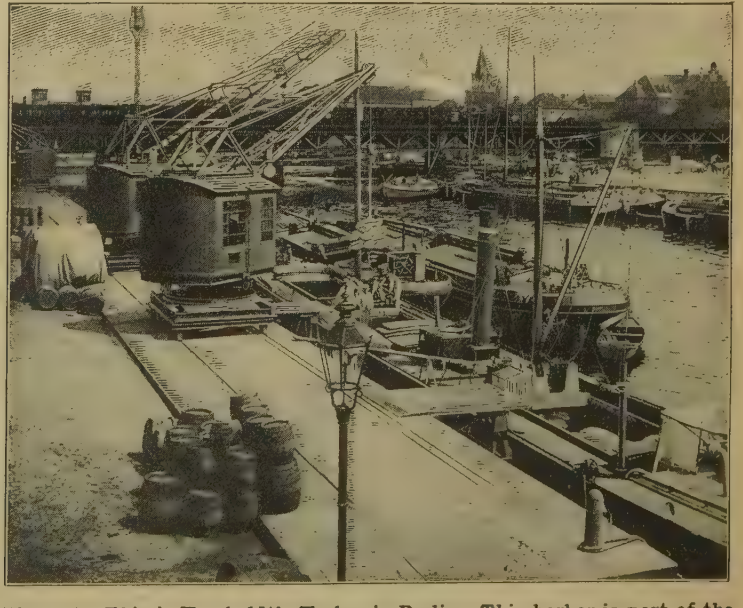

Fig. 382. This is Humboldt's Harbor in Berlin. This harbor is part of the extensive canal system which connects Berlin with the Oder and Elbe rivers. Locate Berlin on the map between pages 181 and 184. In what natural region is it situated? How is its location advantageous for trade and transportation?

Courtesy of Williams, Brown, and Earle

Fig. 383. This is a view of the Rhine near Bonn. Notice the terraced hillsides and the location of the city on the narrow strip of low, flat land immediately bordering the river. The Rhine is a very important commercial highway, and small vessels ascend the river as far as Strasbourg. From Strasbourg the Rhône-Rhine Canal connects the Rhine with the Saône-Rhône waterway to Marseille. Trace this water route between the mouths of the Rhine and the Rhône on the map between pages 181 and 184

Internationalized waterways. In 1919, by the terms of the peace treaty that closed the World War, certain navigable rivers that could be used by several nations were internationalized, or declared open and free for the use of all nations on equal terms. This arrangement was made so as to give the countries in the interior of Europe an easy means of shipping goods by water and engaging in foreign trade. Those people now have the right to use these rivers just as much as if they flowed entirely through their own lands.

The Rhine is internationalized as far as it is navigable, and is a great highway of trade (Fig. 383). The Elbe is internationalized upstream to its junction with the Moldau River, on which Prague, the capital of Czechoslovakia, is located. The Oder is internationalized to the mouth of the Oppa. In the south the Danube is internationalized as far as Ulm. The peace treaty also requires that the Kiel Canal and its approaches shall be maintained free and open to vessels of all nations at peace with Germany, on equal terms (Fig. 384). At Hamburg and at Stettin free zones have been established and leased to Czechoslovakia so that this inland state may have some of the advantages of these seaports.

Climate. The rainfall throughout Germany is sufficient for agriculture, but there is more rain in the western part than in the east. Because of their elevation the higher lands in the south have about the same temperature as the lowlands in the north. North Sea ports are open all the year, but the bays and inlets of the Baltic and the estuaries of the rivers which flow into the Baltic are frozen during a part of the winter. That is because the Baltic Sea is shallower, less salty, and much more nearly inclosed by land than the North Sea.

We may now consider the resources in each of the natural regions of Germany, and see what effect they have had on the occupations of the people.

Lowland plain. This is the most extensive agricultural region of Germany. It is covered with glacial material left by the ice-sheet. These glacial deposits, especially in eastern Germany, are in places very sandy, but even in these light soils potatoes, sugar beets, and rye are important crops. Germany has been the greatest producer of sugar beets in the world. Along the shores of the Baltic flax and hemp are raised.

In the region bordering Denmark the lowlands of Germany are favorable to the grazing of cattle, and here dairy farming is an important occupation. In the northeast German lowlands large numbers of sheep and goats are raised. In places the sands of the lowlands are used in the manufacture of glass.

Central Highlands. These highlands consist of very old rocks, which contain rich mineral deposits. It is the resources found in the ground, such as coal, iron, zinc, lead, copper, and potash, which have had the most profound influence upon the development of Germany during the last fifty years. The coal and iron ore are usually found together; this fact has helped the growth of great iron and steel manufactures.

As the resources were discovered and men invented machinery western Germany rapidly became one of the leading industrial districts of the world (Fig. 385). The manufacture of all forms of cutlery, hardware, and machinery was actively promoted. Textile industries expanded as machinery was invented, and now large quantities of raw cotton, wool, and silk are brought up the German rivers to the manufacturing centers.

Fig. 384. The harbor at Kiel forms the eastern entrance to the Kiel Canal, which connects the Baltic and North seas. *See map on page 171,* M 4. The canal is sixty-one miles long and is deep enough to allow the passage of good-sized ocean vessels. To what nations is it of the greatest use?

Deposits of excellent clay have been found, which is used in the manufacture of china and porcelain. Potash is also obtained in the highland region. It is used in making fertilizers, and thus has helped to promote agriculture.

The forests in the region of the Central Highlands have long received scientific care. The supply of timber has led to lumbering and the manufacture of paper, woodenware, and toys. On the plateau north of the Alps many excellent cattle are raised. Farming is also a profitable occupation of the people here (Fig. 386).

Fig. 385. In spite of the fact that Germany has many great industrial cities where manufacturing is carried on upon a large scale, many of the people are still engaged in home industries. The members of the family in this picture, who live on the edge of the Black Forest, earn their living by making rug-beaters from rattan

The Danube, which rises in the Black Forest only a few miles from the Rhine, flows through this highland region, receiving several large tributaries from the south. At the head of navigation on the Danube is the old town of **Ulm**, where there is a beautiful cathedral and many buildings of historic interest. **Munich** is located on one of the tributaries of the Danube not far from the north base of the magnificent Alpine Range. It is in the midst of a forested region, where the lower slopes are used as pasture lands. It is an important railway center.

The Rhine flows through the Central Highlands in a picturesque gorge. **Koblenz**, a very busy river port and manufacturing city, is located in this gorge at the point where the Moselle joins the Rhine (Fig. 387). **Cologne** is near the place where the Rhine leaves the gorge in the highlands and enters the lowland plain of Germany.

Middle Rhine Plain. The Rhine receives its headwaters from the melting snows of the Alps, and turning northward from Basel flows into a fertile valley from 20 to 25 miles wide. To the west are the Vosges Mountains, and to the east the Black Forest. This lowland portion of the middle Rhine is a valley bordered by two great

Fig. 386. These high-roofed houses are the homes of German farmers who raise hops in the hop district southwest of the Böhmer Wald. The lower stories are the living quarters of the families. The floors above are used for drying the hops after they have been picked and brought in from the fields

cliffs. It was formed in the same way as the lowland of Scotland, that is, by the sinking of the land between the two bordering highlands. The part of this plain that is east of the river belongs to Germany, and it is the best agricultural land in the country. Cereals, hops, and tobacco are the principal crops, but almost any crop that can thrive in a temperate climate can be grown here. The winters are cold, but the summers are hot and the autumns are dry and warm. Fruit is grown, and the sunny southern slopes of the hills are terraced for grapevines.

Freiburg, on the eastern margin of this plain, is situated at the mouth of one of the beautiful valleys of the Black Forest. It is a university town with a beautiful cathedral. **Karlsruhe** is a manufacturing center;

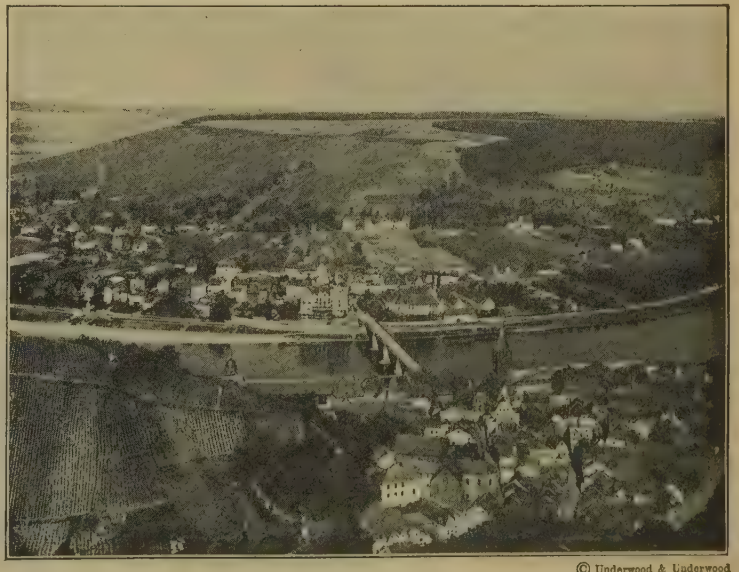

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Fig. 387. This is a view on the lower course of the Moselle River, where it flows through the region of the Central Highlands. This part of the Moselle Valley is a famous grape-growing district. In the left foreground of this view you can see some of the vineyards which cover the hillsides

Frankfort-on-the-Main is an important trading and banking city on a tributary of the Rhine (Fig. 389); and **Mainz** is a river port and manufacturing city.

North slope of the Alps. The Austro-German frontier extending eastward from the beautiful lake of Constance lies on the crest of the Bavarian Alps, and a small portion of this rugged mountain region is therefore included in Germany. The highest summit is nearly 10,000 feet above the sea. The mountain slopes are heavily forested. Several swift streams, tributary to the Danube, flow across this area (Fig. 388).

Cities. In this country it will be most interesting to follow each one of the large rivers and thus associate the important cities with the main drainage lines of the country.

If we start at the headwaters of the Oder and travel downstream, the first large city we reach is **Breslau**. Not far from the margin of the highlands, it is near one of the important coal fields, and the manufacture of cotton, woolen, and linen fabrics has been developed here. Next is **Frankfort-on-the-Oder**, which is a sugar-manufacturing city in the center of a great sugar-beet district. At the head of the estuary is **Stettin**, also a manufacturing center, where many of the largest ocean liners have been built.

The Elbe rises in Czechoslovakia and flows northward through a magnificent gorge in the old mountains bordering the Bohemian Plateau, and then passes out into the Plain of North Germany. **Dresden** is located a little downstream from the gorge. It is a beautiful city with art galleries and public gardens. Among its various industries is the manufacture of the famous Dresden china. **Leipzig**, on a tributary of the Elbe, is a center for printing and publishing, and **Halle**, a little below Leipzig, is an important university town. **Magdeburg** is another sugar-manufacturing center. At the head of the estuary of the Elbe is **Hamburg**, the leading port in northern Europe (Fig. 381). Hamburg is connected by canals with ports on the Baltic Sea. The Elbe is the most important river of Germany, because it is the outlet for so much of the interior country. Near its headwaters are several of the mining regions on the northern margin of the Central Highlands. The products from eastern Germany are brought by means of the canals from the valley of the Oder westward to the Elbe.

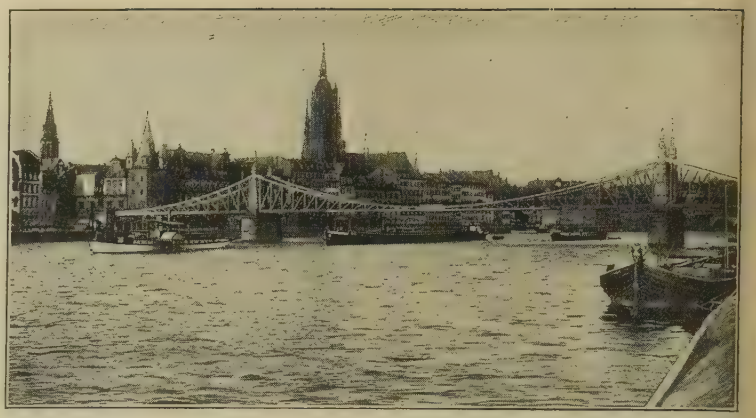

Fig. 389. Frankfort-on-the-Main is so called to distinguish it from another German city of the same name, Frankfort-on-the-Oder. This view shows the river Main with the buildings of the city in the distance. Locate the two cities of Frankfort on your map. What is the chief importance of each?

Berlin, the capital of Germany, is located on a tributary of the Elbe. This is a city of imposing buildings, broad streets and promenades, and beautiful gardens. Many industries have been established here, and manufactured products can be carried by canals to the Oder and thence to Stettin or down the Elbe to Hamburg. The railroads of Germany, which are owned by the government, radiate in all directions from Berlin, and this city has become the greatest railroad center of the country (Fig. 382).

Along the upper course of the Weser there are several industrial centers, but the city of greatest importance on this river is **Bremen**. This is another city at the head of an estuary; it has the advantage of being within easy reach of the sea and yet in the midst of an agricultural district. It competes with Hamburg and the ports on the Rhine for the trade of western Germany.

Fig. 388. This is a modern castle in Germany, located in the beautiful mountain country on the north side of the Alps. It is much like the old German castles which were built at a time when the home of each wealthy nobleman was a strong fortress as well as a dwelling-place. There are many of these old castles in Germany, especially in the mountainous parts of the country

On the banks of the Rhine just beyond the upland belt is **Cologne**, a city with the largest Gothic cathedral in Europe. It is a port to which ocean steamers come, making it one of the busiest places in western Germany. **Essen** is on a tributary of the Rhine which rises in the highlands and flows through coal and iron fields. Essen has become an important center of the iron and steel industry.

East Prussia is separated from the rest of Germany by a narrow strip of land that belongs to Poland, but the German people have the right to ship goods across this Polish territory. **Königsberg** is the capital and seaport of East Prussia.

Government. Before the World War Germany was organized as an empire. At the end of the war the people overthrew the imperial government and set up a republican form of government. The people now elect their own representatives and control the affairs of the nation.

Problems and review questions. 1. What natural regions extend into Germany? 2. What is the best agricultural portion of this country? 3. Where are most of the mineral resources? 4. Why do the North Sea ports remain open and the Baltic ports remain frozen during the winter?

5. Why is there more rainfall in western than in eastern Germany? 6. In what part of this country is the grapevine commonly grown? 7. Where are the best forests of Germany? 8. What natural resources have led to manufacturing? 9. What are the leading manufacturing cities of Germany?

10. What rivers in Germany have large cities near their mouths? 11. What water routes connect Berlin with the sea? 12. What rivers have been internationalized? Why was this done? 13. At what seaports have the people of Czechoslovakia special rights? 14. What part of Germany is entirely separated from the rest of the country? 15. What form of government has Germany to-day?

Fig. 390. This is a view in the Austrian Alps. In the foreground is one of the great glaciers which wind their way down the valleys between the Alpine peaks. These glaciers move very slowly, fed by the snow in the mountains and always melting at their lower ends

Fig. 391. These are the government buildings at Vienna, where the laws of the nation are made. Vienna is noted for the beauty of its buildings, streets, and parks. Locate Vienna on your map. What advantages can you see in its location? What other national capitals are situated on the Danube River?

AUSTRIA

Austria is a small country in central Europe without any seacoast. It includes a portion of the Alps and a portion of the Central Highlands northeast of the Alps (Fig. 390).

On the lower slopes of the mountains there are forests, and in the valley bottoms, especially in the Central Highlands, there are fertile soils. The streams from the high mountains furnish water-power, and there are mines that supply iron, lead, copper, salt, and mercury.

Lumbering, grazing, and some agriculture are carried on, and in the cities there are many industrial plants.

Vienna is the capital and chief city (Fig. 391). It is beautifully located on the Danube River and is laid out with broad avenues that are planted with trees. Just below the city the Alps and the Little Carpathians come to the banks of the river and form a narrow pass known as the Austrian Gate.

The museums in Vienna have wonderfully valuable art and natural-history collections, and this city has long been one of the leading musical centers of the world.

The Danube River is a natural highway of travel from east to west, and the railroad routes from north to south, connecting Berlin with the Italian and Balkan peninsulas, cross the river where Vienna is located. The crossing of these routes of travel and trade has led to the growth of Vienna as an industrial and commercial center.

Problems and review questions. 1. What state in the United States is about as large as Austria? *See Appendix.* 2. What natural regions extend into this country? 3. What are the chief natural resources of Austria? 4. What navigable river may be used by the Austrian people in trading with other countries? 5. What are the chief occupations of the people? 6. What are the reasons for the location and growth of Vienna? 7. Where is the Austrian Gate? 8. Why is it so named?

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Fig. 392. Budapest, the capital of Hungary, is divided by the Danube River into two cities, Buda and Pest. This view shows one of the bridges which unite the two cities. Locate Budapest on the map between pages 181 and 184. How should you describe its location? What advantages for trade has it?

HUNGARY

Physical features. Most of this country is included in the lowland called the Plain of Hungary. This lowland and the surrounding mountains form a basinlike area within which the streams from the mountains have spread out fine materials and in this way have built up a very fertile land. Hungary is a country without a coast line, but it has free use of the Danube River.

The Danube River crosses from the northwest to the southeast. Just upstream from Budapest the mountain ranges come close to the river, forming in the valley of the Danube a narrow pass which is called the Hungarian Gate. Farther downstream, where the Danube flows through the Carpathian Mountains, is another narrow place in the valley, which is known as the Iron Gate.

Fig. 393. These Hungarian farmers are harvesting hay on their farm in the rich, fertile plain of the Danube. About how much rainfall does this plain receive during the year? *See map on page 216.* Why is it so favorable for agriculture? What are the chief products grown in this region?

Climate. In the mountains that surround the Plain of Hungary there is abundant rainfall, amounting in places to 80 inches a year; but in the lowland the rainfall is uncertain, and there are often long periods of dry weather. The rain of the lowland comes chiefly in May and June, when the cereal crops, especially wheat, are getting a good start. The latter part of the summer is dry, and this is favorable to the ripening and harvesting of the wheat. Since Hungary is far from the sea, there are great changes in temperature. The summers are warm and the winters are cold. During the month of July the range of temperature is usually between 65° F. and 70° F., and in January, the coldest month, it is from 22° F. to 30° F.

Fig. 394. This is a view on the wharves at Budapest. In the foreground is a Hungarian woman selling vegetables. On the river are some of the boats which carry passengers and freight up and down the Danube

Resources and occupations. The fertile soil of the lowland of Hungary is its chief natural resource. For this reason agriculture has become the chief occupation of the people (Fig. 393). Corn is the principal crop of the Plain of Hungary, and large quantities of excellent wheat and tobacco are grown. Swine are raised in large numbers, and dairy-farming and the raising of poultry are also important occupations of the people.

In the east and south there are extensive grasslands that have encouraged many to raise cattle and sheep. The forests about the base of the mountains have led to lumbering.

Budapest is the capital of Hungary. Buda is located on the high western bank of the Danube River, and Pest is on the lowland bordering the stream on the east. The two cities are joined by bridges (Figs. 392, 394). Budapest is located at the margin of the great wheat-producing district and has naturally become the center for the shipment of grain and the manufacture of flour.

Problems and review questions. 1. Why should farming be the chief occupation of the people of Hungary? 2. Where did the fine alluvial soils of the Plain of Hungary come from? 3. Why has the lowland a light rainfall? 4. What is the chief crop of the lowland? 5. What other products are raised in the lowland? 6. What can you tell about Budapest? 7. What internationalized river may be used for commerce by the people of Hungary? 8. Into what sea does it flow?

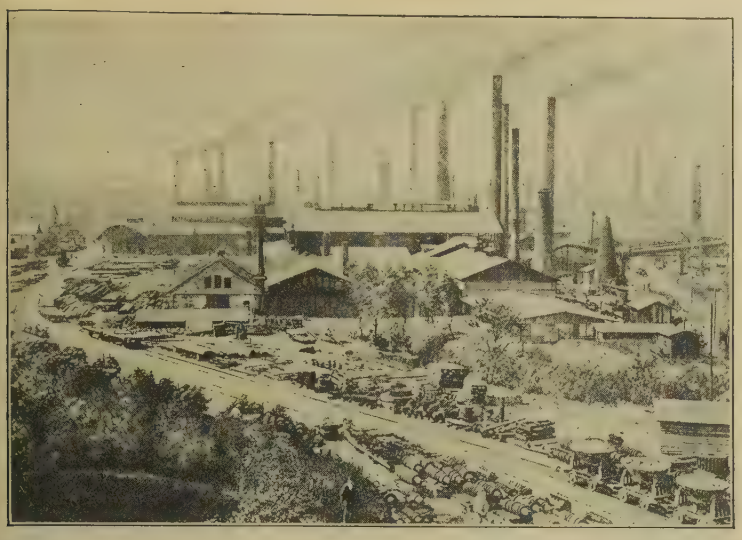

Fig. 395. This is one of the steel-manufacturing centers in Czechoslovakia. This country is very fortunate in possessing large supplies of coal and iron, and its importance as an industrial nation is sure to increase in the future. Locate the coal and iron areas on the map between pages 181 and 184

Fig. 396. Brünn is the second largest city in Czechoslovakia. This view shows a public square in Brünn on market day when the farmers of the surrounding agricultural country bring their products to the city to sell them. Locate Brünn on your map. What natural advantages has this city?

CZECHOSLOVAKIA

This country contains about 50,000 square miles, and is therefore about the size of the state of New York. It is in central Europe and has no coast line. In the west are the mountains and plateau of Bohemia, and in the east is a portion of the Carpathian Mountains.

Climate. The mountains cause variety in the climate. The temperature varies with the elevation. The distance from the sea causes considerable change in temperature from summer to winter. In the mountain areas the rainfall is plentiful, giving rise to many good streams that furnish water-power.

Resources and occupations. Forests cover much of the mountain slopes, and the valley and plateau lands have fertile soils suitable for farming and grazing. The Bohemian district contains rich stores of coal and iron and large supplies of high-grade clays that are used in making porcelain. The Carpathian Mountains are also rich in mineral wealth. Iron, gold, and silver are obtained from the mines in this range.

The natural resources of this country have led to lumbering and mining in the mountains, to farming and grazing in the areas of fertile soils, and to manufacturing in the cities. The supplies of iron and coal are used in the making of steel and in the manufacture of machinery (Fig. 395). The clays near Karlsbad have made possible the establishment of a porcelain industry that is known throughout the civilized world. Some of the sandstones of Bohemia are ground up and used in the manufacture of glass; wood pulp is made into paper; hides and skins are made into leather; and in the valley of the Elbe, where there is good water-power, cotton, woolen, and linen goods are made.

Prague, the capital of Czechoslovakia, is situated in the most productive part of the country. It has become one of the chief industrial and trading centers in central Europe (Fig. 397). Prague is on a tributary of the Elbe River. Czechoslovakia has free use of the Elbe, Oder, and Danube rivers, and harbor privileges in Hamburg, Stettin, Trieste, and Fiume.

Brünn is a second industrial city. Its location and growth are due to certain rich deposits of coal and iron that have helped it to become a leading city in the manufacture of agricultural and industrial machinery.

Fig. 397. This is a view of part of the city of Prague, the capital of Czechoslovakia. Prague is located on the Moldau River and is a busy industrial city. Its factories include paper mills, machine works, sugar-refining plants, and breweries. Locate Prague on the map between pages 181 and 184. Why has Bohemia developed so many manufacturing industries?

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Fig. 398. The free city of Danzig is located on the Baltic Sea at the mouth of the Vistula River, and is the chief commercial port of the republic of Poland. This is a view along the water front at Danzig. Locate Danzig on your map. Why is this port the natural outlet for Poland?

Pilsen, in the rich grain-growing section of Czechoslovakia, is famous for the beer brewed from the barley and hops which are raised chiefly for this purpose. Pilsen is also well known for the manufacture of glassware.

This country is organized as a republic.

Problems and review questions. 1. What are the chief natural resources of Czechoslovakia? 2. How has each one of the natural resources influenced the occupations of the people? 3. What internationalized rivers may be used for transportation? 4. What ports are available? 5. Name and give the location of the capital. 6. Name two other important cities and state the leading industries of each one. 7. Will this country become chiefly agricultural or manufacturing? Give reasons for your answer.

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Fig. 399. This is the city hall at Warsaw. The city is located at the head of navigation for steam vessels on the Vistula, and is also an important railroad center. Locate Warsaw on your map. How far is Warsaw from Danzig by water? Why has Warsaw become an important commercial and industrial center?

POLAND

This country, now organized as a republic, is located between Germany and Russia and has access to the sea through the free city of Danzig (Fig. 398). It is a lowland area included within the Central Plains of Europe. Much of the land is marshy, and there are a great many lakes. The lakes and marshes are due to the work of the

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Fig. 400. Many years ago Poland was one of the most powerful kingdoms of Europe. The country was much larger than it is now. This building, which is still standing in Warsaw, was the palace of one of the kings who ruled Poland more than two centuries ago. How is Poland governed to-day?

continental ice-sheet that long ago invaded this region (Fig. 317). Most of the soils here are of glacial origin.

The Memel, or Niemen, River, which forms a part of the northeastern boundary of Poland, has been internationalized as far upstream as Grodno. This river is navigable and is an important highway for the transportation of farm products. The Vistula is the largest and most important river of Poland.

The rainfall is enough for agriculture, although it is less than the amount received in western Germany.

Resources and occupations. The soils are the most valuable of the natural resources of Poland. Most of the people are farmers, and large crops of potatoes, rye, oats, wheat, and sugar beets are raised. Poultry-raising and dairy-farming are also important occupations. Many are engaged in raising cattle, sheep, and horses.

There are excellent supplies of coal in southern Poland, and there are mines that produce iron and others where lead and zinc are obtained. The mineral resources, especially the good supply of fuel, have led to manufacturing.

Cities. **Warsaw,** the capital of Poland, is on the west bank of the Vistula, and in the midst of a broad, fertile plain (Figs. 399, 400). There are coal fields in the vicinity of **Lodz,** and both Warsaw and Lodz have become important manufacturing centers.

Krakow is the leading city in southern Poland. A few miles from this city there are great underground caves in salt. Some of the rooms are so large that they are used for dance halls.

Problems and review questions. 1. In what natural region of Europe is Poland located? 2. What is the explanation of the numerous swamps and lakes in this country? 3. What free seaport may be used by the people of Poland? Is that port open all winter? 4. What internationalized river is available? 5. What is the chief river of Poland? 6. What are the leading occupations of the people? 7. Name and give the location of the capital.

Fig. 401. Libau, on the Baltic Sea, is the second largest port of the Baltic States. Its harbor is free from ice in winter, which adds greatly to its usefulness. This view shows part of the harbor of Libau. What products have the Baltic States for export? What do they need to import in return?

BALTIC STATES

The small countries of **Esthonia, Latvia**, and **Lithuania** are on the eastern coast of the Baltic Sea south of the Gulf of Finland. They are partly forested, and timber-cutting is therefore one of the chief occupations of the inhabitants. Some of the land is used for grazing, and dairy-farming is carried on. Many of the people are engaged in agriculture; flax is one of the chief crops.

Riga, the capital of Latvia, is located near the mouth of the Düna River and is the chief seaport for the Baltic States (Fig. 402). The exports of Riga are flax, timber, and dairy products. Coal is imported from England and cotton from the United States. **Reval**, the leading city of Esthonia, is also an important seaport. **Vilna**, in Lithuania, is a growing industrial center.

FINLAND

Finland is a hilly country, and among the hills there are thousands of lakes and marshes. It is an old, worn-down land somewhat like New England, and like New England it has been invaded by great ice-sheets. There are stony soils, and on the surface are many bowlders.

The winters are long and the summers are short and hot. The rainfall is about 10 inches a year in the north and about 25 inches a year in the south.

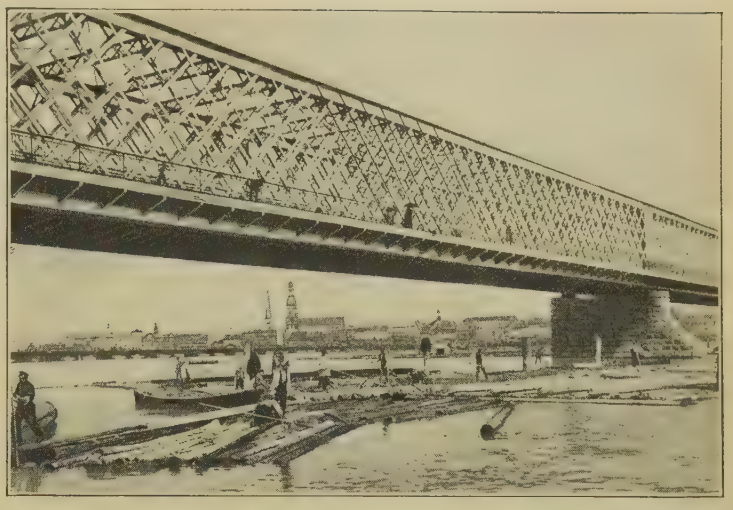

Fig. 402. This picture shows the railroad bridge across the Düna River at Riga, and in the distance the buildings of the city. Notice the log rafts under the bridge. Nearly one third of the area of Latvia is forested, and each year thousands of logs are floated down the rivers to the ports

Forests cover a large part of Finland, and they have led to lumbering, to the making of paper, and to the manufacture of woodenware. Quarrying is important, and there is some mining of copper; many of the people are engaged in fishing and a few in farming. Most of the people live in the southern part of the country, near the Gulf of Finland or on the shore of the Gulf of Bothnia (Fig. 403). **Helsingfors** is the capital and chief seaport.

Finland is organized as a republic.

Problems and review questions. Where are the small Baltic States located? 2. What is the chief seaport of this group of countries? Is this port open all the year? 3. What are the chief occupations of the people in the Baltic States? 4. Describe briefly the physical features of Finland. 5. What disadvantages must the people of this country contend with? 6. What are the principal resources and the resulting occupations in Finland?

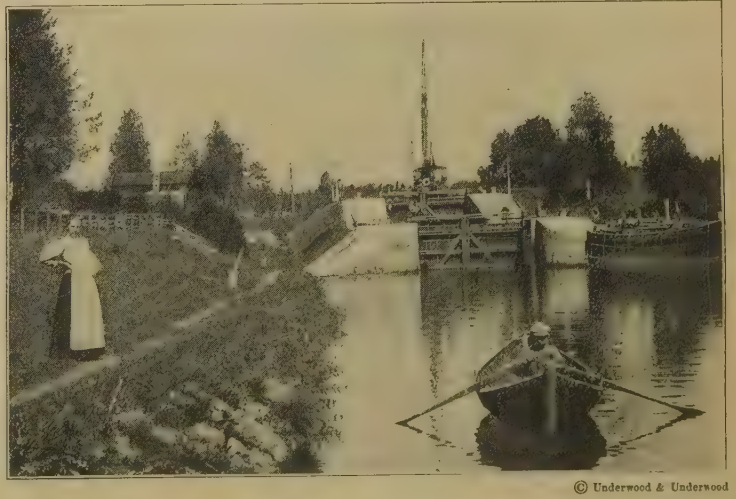

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Fig. 403. This is one of the locks in the Saima Canal in Finland. The canal connects Lake Saima with the Gulf of Finland at Viborg, making it possible for the people of the interior of the country to send their products easily and cheaply to the coast. Locate Viborg and Lake Saima on your map

Fig. 404. This is a view of the Volga River as it winds across the level plain of Russia. The Volga freezes over in winter and becomes very shallow in summer, yet it is an important commercial highway. On the map on page 201 trace the route by water from Astrakhan to Petrograd

Fig. 405. This picture was taken on the banks of the Dvina River near Archangel in the month of October. Notice the snow on the ground. The harbor of Archangel is icebound from seven to nine months in the year. Locate Archangel on the map on page 201. On what sea is it?

RUSSIA

Lowlands. Most of Russia is in the vast lowland that stretches from the Black Sea to the Arctic Ocean and from the Ural Mountains to the Baltic Sea. Within this great lowland there are a few hilly places, and about the margins there are several mountain ranges. *See map on page 201.*

Mountains. The Ural Mountains and the Timan Range, in the northeast, are old and worn down. They are like the Northwest Highlands in being the stumps of mountains that once were higher. On the southern border of the lowland, between the Black and Caspian seas, is the young and magnificent range of the Caucasus. The lofty peaks of the Caucasus rise to even greater heights than the summits of the Alps, and there are longer glaciers in the Caucasus Mountains than in the Alps.

Area below sea level. *See map on page 201.* The southeastern part of Russia, near the mouth of the Volga and about the north end of the Caspian Sea, is below sea level. It is a part of a former sea floor. The Caspian was once part of a great inland sea which included the Black and Mediterranean seas and extended northeastward over the lowlands of western Siberia to the Arctic Ocean. Later the lands rose and most of the waters of the inland sea drained off into the ocean basins, leaving the Caspian Sea without an outlet. Since that time the Caspian Sea has been slowly drying up. As its waters have evaporated, more and more of its sea bottom, which is below sea level, has become dry land.

Lakes. The numerous lakes in the northern and western portions of Russia are due to the continental ice-sheet which formed on the Scandinavian Peninsula and spread until it covered a large part of Russia. The deposits left by the ice have formed many basins where rain waters have collected, and in many places streams have been blocked so that lakes have been formed.

Rivers and canals. Several of the larger streams of Russia are navigable and of very great value as transportation routes. The Volga, the longest river in Europe, flows into the Caspian Sea (Fig. 404). The Don and the Dnieper reach the Black Sea, and the Dvina flows northward to the White Sea. Since the land is low, many canals have been made, connecting different river systems, until now there are water routes from the Baltic Sea to the Black Sea. *See map on page 201.* The waterways were developed before there were many railroads, and yet they are still very important in commerce.

Coast line. Russia is unfortunate in not having more good harbors. The ports in the Far North and on the Gulf of Finland are frozen for a large part of each year (Fig. 405). By means of the long, navigable rivers and the railroads the Black Sea ports may be used, for they are open throughout the year, but it is a long, indirect route from the Black Sea to the great seaports of the leading nations of the world.

Natural resources. *Use map on page 201.* Russia is fortunate in having large areas of most excellent soils, extensive forests, and great mineral wealth. Coal is found in several places in the lowland and in the foothills of the mountains. There are also rich supplies of oil. One of the leading mining districts is in the Ural Mountains, where platinum, gold, copper, and iron are obtained. All these metals are very important in modern industries. The Ural Mountains are believed to be the world's richest source of platinum. Petroleum is abundant around the shores of the Caspian Sea.

The fur-bearing animals of the forests and the fish in the streams and seas are also valuable resources.

Climate. Russia is so far inland and extends so far from north to south that there are great extremes in temperature and great variety in the climate. The rainfall is greatest in the west and decreases to the east and southeast until in the vicinity of the Caspian Sea there is a large semidesert area.

In the Far North the ground never thaws for more than a few inches below the surface. There are frosts for six months of the year, and all the streams and harbors are frozen over in winter. In the extreme south the climate is very warm. For several months the temperature averages 70 degrees or over. This means that during the warmest part of the day the temperature will be much above 70 degrees. In the central part, and especially near the eastern boundary of Russia, the winters are cold, more like those in the northern part of the country, and the summers are warm. Here the extremes in temperature during the year are the greatest.

Fig. 406. The city of Petrograd was founded more than two hundred years ago by a Russian emperor who wished to have a great Russian city on the Baltic Sea. Locate Petrograd on your map. Why is the location of Moscow more favorable for the capital of the nation? What are the exports of Petrograd?

Home work. 1. In the best reference book available read about the peasant life in Russia. 2. Find out all you can about the present government of Russia.

Occupations. The occupations of most of the Russian people are directly dependent upon the climatic conditions. In the tundra of the Far North, fishermen, hunters, and reindeer herders live a wandering life. On the southern margin of the tundra belt there are low, stunted trees; farther south is the great evergreen forest. Here timber is cut and wild animals are trapped for their furs.

South of the evergreen forest, where the climate is less severe, is the forest of broad-leaved trees. Here frosts are common for from two to four months of the year, but agriculture is possible. Timber is cut and flax, rye, barley, oats, and large quantities of potatoes are raised where the forest has been cleared away.

The famous black-soil belt of Russia, where immense crops of wheat are raised, is south of the forested area.

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Fig. 407. In the foreground of this view is the Moskva River, on which Moscow is located, and in the background are some of the public buildings of the city. At the left rise the towers of the old fortress which is known as the Kremlin. Locate Moscow on your map and explain its commercial importance

Here the people appreciate the advantages of labor-saving devices, and American harvesting machines have been introduced.

The dry steppe country to the southeast is a grassland, where the herding of cattle and sheep is the most profitable occupation. Near the shores of the Caspian Sea the land is so dry that very little will grow there.

The mining of metals in the mountains, the discovery of coal and oil, and the cutting of timber have led to the development of manufacturing in several of the cities. The raw materials from the farms and the wool and hides that are supplied from the grazing districts have also encouraged the manufacturing industries.

Cities. All the large cities of Russia are on the rivers or on the coast. **Petrograd,** the former capital, is built largely on piles in a swampy region at the mouth of the Neva River. It is a city with magnificent buildings (Fig. 406).

Archangel, the oldest Russian port, is on the White Sea. It is at the mouth of the northern Dvina (Fig. 405).

Moscow, the capital of Russia, is much more centrally located than Petrograd. It is on one of the tributaries of the Volga and in the midst of forests which have furnished an abundance of fuel and building material. The rivers have made it possible to bring to this center raw materials, such as flax and grains from the agricultural districts. Coal is obtained a little south of the city,

and Moscow has become a manufacturing center. Cotton, linen, and woolen goods are made here. This city is also an important trading center and one from which machinery is distributed to the great farming regions of Russia (Fig. 407). **Tula**, a little south of Moscow, on a still smaller tributary stream in the Volga system, is in the midst of a coal field, and by importing iron this city has developed industries like those in Sheffield, England.

At the junction of the Oka and the Volga is **Nizhnii Novgorod**, a city built partly on a hill and partly on the lowland bordering the stream. It is famous for its annual fair, to which come merchants and traders from all parts of Europe and Asia, and some from more distant lands. **Perm** is located near the western base of the Ural Mountains on a tributary of the Volga and is the center of one of the great mining districts of Russia. It is on the railroad that starts from Petrograd and joins the transcontinental line across Siberia.

Samara is a river port situated at a very sharp bend in the Volga River, and from here another railroad, which starts at Riga and goes by way of Moscow, crosses eastward and joins the great Siberian road. **Astrakhan**, at the mouth of the Volga, is the chief port on the Caspian Sea and the center of the sturgeon fisheries (Fig. 408).

Fig. 408. These men are Caspian Sea fishermen. They have just brought ashore two large sturgeon which they have caught. The sturgeon are valuable chiefly for their eggs, which are salted and packed in oil for export. In this form they are known as *caviar*, a product which finds a large market in Europe and the United States

SMALL COUNTRIES SOUTH OF THE CAUCASUS

The people living south of the Caucasus Mountains and north of the highlands of Armenia speak many different languages and have such different customs that they have separated into three groups. Two small republics have been formed — **Georgia** and **Azerbaijan**. Georgia includes part of the Black Sea coast, and Azerbaijan extends to the Caspian Sea. Surrounding Erivan is a group of Armenians who wish to become a part of the Armenian Republic.

Here the summers are warm and dry, but the winters are cold and rainy. To the north are the magnificent snow-covered peaks of the Caucasus that furnish an abundance of water to the streams that flow southward and then to the Black and Caspian seas. Cattle, sheep, and goats are raised on the foothills of the mountains, while cereals, cotton, and fruits are produced in large quantities on the lowlands.

At the eastern end of the Caucasus Mountains, on the shores of the Caspian Sea, is **Baku**, in the midst of one of the greatest oil-producing regions in the world. Much of the oil is pumped through pipes up the valley of the Kura to **Batum** on the Black Sea, and shipped from there to various ports of Europe and to Egypt. Some of the Baku oil is used as fuel on boats in the Caspian Sea.

Problems and review questions. 1. Explain the great difference in temperature from north to south in Russia. 2. Explain the difference in rainfall from east to west. 3. What portion of this country has soils of glacial origin? 4. What sources of fuel and power are there in Russia?

5. How does the climate affect the occupations of the people in this country? Give examples. 6. What is the occupation of most of the people in Russia? 7. In what ways have the rivers of Russia proved to be of great value to the country?

8. What large cities are located on rivers? 9. In what part of Russia are there rich mineral deposits? 10. Where are the small republics of Georgia and Azerbaijan? 11. What disadvantages have the people of Russia to contend with?

MAP STUDIES

1. What European countries are shown on this map? 2. What navigable river flows into the White Sea? 3. What navigable river flows into the Caspian Sea? 4. Name three large navigable rivers that flow into the Black Sea. 5. What is the chief river of Poland?

6. Describe an inland water route from the White Sea to the Caspian Sea; from Danzig to the capital of Ukraine. 7. What are the chief ports on the Baltic Sea? 8. Describe the water route from Odessa to Athens.

9. What cities appear to be important railroad centers? 10. From this map locate the chief forest area. Refer to the map opposite page 216 to see if you are correct. 11. Locate areas where sugar beets are raised; where wheat is produced; where flax is grown.

12. Where are the Russian mines that produce metals? 13. Where does the oil shipped from Odessa come from? 14. Where does the oil that is shipped from Batum come from? 15. Where are the Russian supplies of coal and iron? 16. What is the chief food fish in the Caspian Sea?

17. If a canal were made from the Black Sea to the Caspian Sea, which way would the water flow? 18. Is New York or Constantinople farther from the equator?

19. Is Paris or the capital of Ukraine nearer the north pole? 20. Is London or the capital of Poland farther from the equator? 21. What port in northern Russia is in about the same latitude as the capital of Iceland?

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Fig. 409. This is the Opera House at Kiev, the capital of Ukraine. Kiev is a very old city and is the center of Ukrainian art, culture, and religion. To the Ukrainians and their neighbors, the Russians, it is a holy city, and thousands of pilgrims visit its churches each year

UKRAINE

This republic is east of Poland and north of the Black Sea. It is a part of the Central Plains of Europe and is the southwestward extension of the very fertile black-soil belt of Russia.

The climate is continental; that is, the rainfall is not heavy and the range in temperature is great. The rainfall is enough for agriculture, however, and almost all the people are engaged in farming. Immense crops of wheat and other grains are raised, and large quantities of grain are exported (Fig. 410).

The people of Ukraine are able to raise large amounts of necessary foods. This makes it possible for the population to increase and for all industrious people to be prosperous. There are excellent supplies of coal and iron in this country, and such resources will undoubtedly lead to the further development of manufacturing.

Manufactured goods are received in exchange for the grains exported. American agricultural machinery is used, and many modern labor-saving devices have been introduced.

Kiev, the capital, is located on the Dnieper River and is an industrial and commercial center (Fig. 409). Sugar-refining is important here. **Odessa** is the chief seaport, and large quantities of wheat are shipped from this port (Fig. 411).

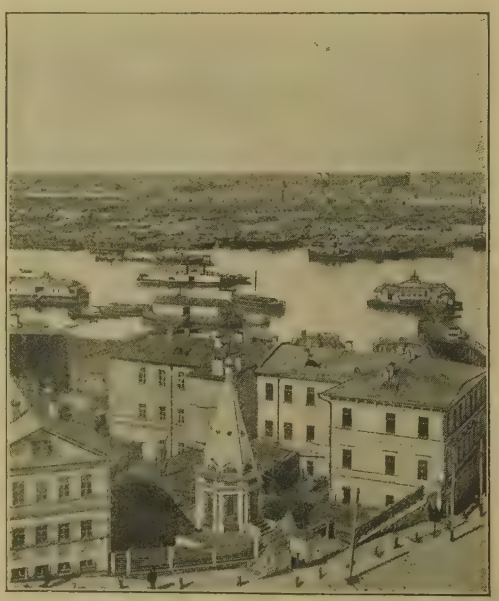

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Fig. 411. This view shows part of the harbor of Odessa, the leading seaport and commercial center of Ukraine. Locate Odessa on the map on page 201. What are its chief exports?

RUMANIA

In the northwest Rumania is mountainous and includes the Plateau of Transylvania. In the east and south there is a lowland plain which is an extension of the Central Plains of Europe.

Most of the low country is a wonderfully fertile land, and agriculture is the chief occupation (Figs. 413, 414). The rainfall is moderate in the plain, and wheat is the leading product (Fig. 412). In the drier eastern parts of the lowland, where there is an abundance of grass, cattle and horses are raised.

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Fig. 410. The people in this picture are Ukrainian peasants. The woman has come across the fields from her house with water for her husband and son, who are at work on their farm. Notice the rude yoke by which she carries the water buckets. What products do these Ukrainian farmers raise? Why is Ukraine a rich agricultural country?

The lower slopes of the mountains are forested, and near the eastern base of the Carpathians large quantities of oil are obtained. There are mineral resources in the mountains that await development. The plateau district is suitable for raising sheep and cattle.

Bucharest is the capital and chief trading center. It is a city with all modern conveniences, and it has become the home of the wealthy people of Rumania, who control vast areas of the farming districts. The great mass of the people are peasants who live in very simple homes and without the comforts that come to industrious farmers in many other countries.

Kronstadt is a manufacturing center. **Galatz** is on the lower Danube and is the outlet for most of the products of Rumania. Ocean-going vessels reach this port.

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Fig. 412. At the harvest season the Rumanian farmers take their great threshing machines into the fields, and as the wheat is cut the bundles are put through the thresher to separate the grain from the straw. Why is this part of the Danube Valley so favorable to the growth of wheat?

Problems and review questions. 1. What are the chief natural resources of Rumania? 2. How have the resources influenced the occupations? 3. What country is southern and eastern Rumania most like? 4. What navigable river is available? 5. Name the capital and chief port.

Home work. Find out the origin of the name "Rumania."

MEDITERRANEAN LANDS

The countries of Europe which we have not yet considered occupy three peninsulas extending southward into the Mediterranean Sea. In the west is the Iberian Peninsula, which is divided between Spain, Portugal, and Andorra, the tiny republic which is located high among the Pyrenees. Italy occupies the long peninsula with the curious boot-shaped outline. The eastern, or Balkan, peninsula is divided into Jugoslavia, Albania, Greece, Bulgaria, and the area about Constantinople.

These peninsulas of Europe are mountainous regions and, with the exception of the Plain of the Po, have very limited lowlands. *See map between pages 207 and 210.*

The temperature in the Mediterranean lands is distinctly warmer than in other parts of Europe. This is due in part to the latitude and in part to the high mountains that keep off cold winds from the north.

The rainfall in this part of Europe comes chiefly in winter. This needs a special explanation. During the summer, when the sun's rays are vertical north of the equator, the belt of the northeast trade winds has moved so far northward that it includes the peninsulas which extend into the Mediterranean. These northeast trades come from over the land and contain little moisture. Furthermore, since they are blowing toward the equator and getting warmer, their tendency is to take up more moisture. The Mediterranean countries therefore have a dry summer, and the skies are clear and blue.

When winter comes, the trade-wind belt migrates southward, and the westerly winds, which bring moisture from the Atlantic Ocean, prevail in these lands. Clouds form and rain falls abundantly in most of the Mediterranean countries during the winter. The rainfall is heaviest on the windward sides of the mountains and lightest in the plateau of central Spain, where the mountains keep off the rain-bearing winds or force them to give up their moisture before they reach the interior.

The peoples in the Mediterranean portion of Europe have languages quite distinct from those used in the countries farther north. The Spanish, Portuguese, and Italian languages are related in origin to the Latin used by the ancient Romans. The people who migrated into Rumania were from Italy, and their language is much like the Italian. The Greek language of to-day is directly derived from that of the ancient Greeks, and the languages of the various Balkan states show a relationship to the ancient Greek and Roman tongues, though the long isolation of the people among the mountain valleys of this peninsula has produced dialects which are quite distinct.

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Fig. 413. This man is a Rumanian farmer. He is pitching hay with a homemade wooden pitchfork. What other countries share with Rumania the agricultural advantages of the fertile Danube Valley?

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Fig. 414. In Rumania, as in most of the other countries of Europe, the women work in the fields just as the men do. These Rumanian peasant women are starting out for their day's work of cutting wheat

SPAIN

Surface features and climate. Most of Spain is included in the Iberian Plateau, which is called the Meseta. About the margin of this plateau there are mountain ranges that obstruct the winds and force them to give up their moisture. The annual rainfall is about 100 inches in the Cantabrian Mountains and between 60 and 80 inches in the Pyrenees. The Sierra Morena and the Sierra Nevada, because of their elevation, receive a moderately heavy rainfall, but the central portion of the country, the Meseta, is one of the driest parts of the continent of Europe.

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Fig. 415. This is the *Puerta del Sol*, the largest public square in Madrid. Eight of the principal streets meet in this square, making it the business center of the city. Locate Madrid on the map between pages 207 and 210. In what natural region is the city situated? Describe the climate here. Is the location of Madrid a favorable one for the capital of the country?

Since the Meseta is so shut in by mountains, it has a climate somewhat like that of a land in the interior of a continent. The rainfall is light, and there are extremes in temperature. At Madrid the average temperature is about 40° F. in the coldest month and about 75° F. in the hottest month. At the seaports of Spain the variation in temperature from the hottest to the coldest month is very much less than it is in the Meseta.

Resources and occupations. In the region of the Pyrenees and Cantabrian Mountains there are magnificent forests of ash, beech, and cork oak (Fig. 417), and the Cantabrian Range contains rich deposits of coal and iron. These resources have led to lumbering and mining. The iron ore is exported from harbors on the Bay of Biscay to Wales. In the valleys between the mountains there are dairy farms.

The northern portion of the Meseta is suitable for the raising of cereals, especially wheat, which ripens in a dry climate. In places the streams that come from the mountains are used for irrigating the fields. In the poorer grasslands of the plateau sheep and goats are raised. Here many of the sheep are merinos, which produce a very fine grade of wool. The southern portion of the Meseta is so dry and the soil is so poor that little but grazing is carried on in this part of Spain.

Great canyons cross the central part of the Meseta, and they are such effective obstructions to communication that the life in the northern portion of the plateau is quite distinct from that in the south.

In the valley of the Guadalquivir River is a fertile lowland in which large crops of tobacco, oranges, grapes, figs, cotton, and sugar are raised by means of irrigation. Wine is produced in the vineyards and exported from **Cadiz**, the chief seaport in the south of Spain. This rich lowland region also produces excellent horses, bulls, and sheep.

In the Sierra Nevada there are valuable deposits of iron, copper, silver, lead, zinc, and quicksilver. These resources have led to mining, and Spain now produces more lead and copper than any other European country.

The lowlands bordering the Mediterranean coast have a climate much like that of southern California, and these lands have been carefully cultivated. Even the slopes of the mountains are made useful by terracing, and all kinds of Mediterranean fruits are grown. Fresh and dried fruits and wine are exported. In this region bits of cork are used in packing the fresh grapes. The cork is very light and does not injure the fruit.

The lowland of the Ebro River, which is located just south of the Pyrenees, has a poor soil which requires irrigation. This lowland is shut off from the sea by a mountain range, through which the Ebro River flows in a deep gorge to the Mediterranean Sea.

Fig. 416. This is a very old bridge across the Tagus River at Toledo. Locate Toledo on your map. This is one of the oldest cities in Spain and was once the capital of the kingdom

Cities. **Madrid** is the chief city of the interior and is the capital of Spain. Over half a million people live here, but the city is unlike the large cities of central and western Europe, because manufacturing is not an important occupation. The capital has become the chief railroad center, although it is difficult, on account of the deep canyons, for railroads to be constructed over the top of the Meseta. Madrid has a magnificent royal palace and a wonderful art gallery. In many respects it is an exceedingly interesting and attractive city, but the surrounding country is an arid waste.

Fig. 417. These Spanish workmen are cutting sheets of cork oak bark into strips. This is one of the steps in the process of making corks from the bark of the cork oak tree

Seville is an industrial and commercial center. Iron and coal are supplied from the mines in the Sierra Nevada, and many products are brought from the lowland of the Guadalquivir River. Large quantities of tobacco are manufactured here.

Barcelona, second to Madrid in size, is the chief seaport of Spain. It is built on a narrow coastal plain but has a good harbor (Fig. 418). Wool, cotton, and silk are brought to the city to supply its large textile mills. **Valencia** is beautifully situated in a garden region, where, in addition to cotton, all kinds of Mediterranean fruits are raised.

Possessions. The Balearic Islands in the Mediterranean Sea belong to Spain. They have a very mild climate and are attracting more and more tourists. The soils are fertile, and tropical fruits are easily raised. The Canary Islands (*see map, p. 227*) also belong to Spain.

In Africa Spain has possession of two small areas, Rio de Oro on the northwest coast and Rio Muni on the Gulf of Guinea. In addition a few of the islands in the Gulf of Guinea belong to Spain.

It is interesting to note how few foreign possessions remain to Spain, the nation which once controlled vast areas in the two Americas and sent the first sailing vessel around the world.

Gibraltar is a bold rock at the extreme southern end of the Iberian Peninsula, joined to the Sierra Nevada by a sand bar which is neutral land. The rock has been in British possession for more than two centuries and is one of the strongest fortifications in the world (Fig. 419).

Problems and review questions. 1. What are the chief mountain ranges of Spain? 2. Why is the climate of the central plateau of Spain very dry? 3. What are the chief occupations of the people who live on the plateau of Spain? 4. Why has this not become a manufacturing or industrial region?

5. In what portions of this country have mineral deposits been found? 6. What two minerals has Spain in great abundance? 7. Where is irrigation practiced? 8. What fruits are raised here in abundance? 9. What place in Spain should you like most to visit? Why? 10. Name the capital and two seaports.

Home work. Read about the cork oak tree. Find out all you can about where it grows and how corks are made from its bark.

Fig. 418. This is a view of the busy water front at Barcelona. At the left is the customhouse where the charges on exports and imports are collected. Locate Barcelona on your map. What things do you think the ship in this picture may have brought to Barcelona? What products will it take away?

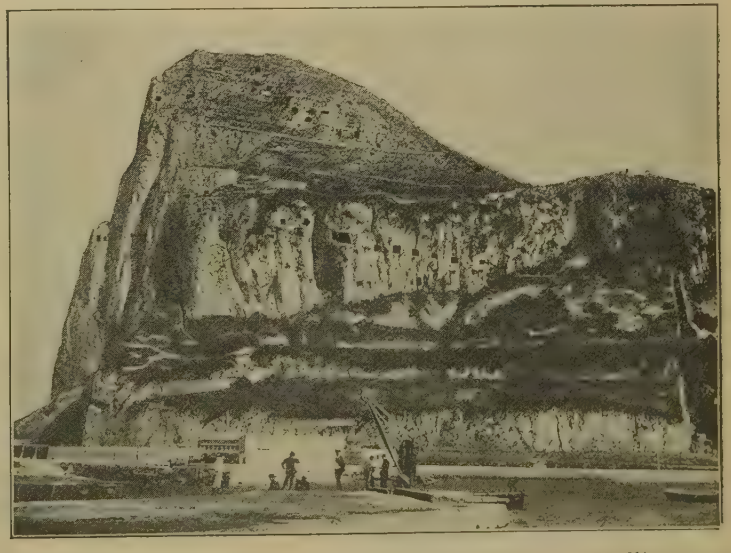

Fig. 419. The rock of Gibraltar guards the entrance to the Mediterranean Sea from the Atlantic Ocean. Because of its commanding position many nations have tried to gain control of it. Since it has been in British possession the British people have kept the strait open for the vessels of all nations

Fig. 420. The city of Lisbon is well located on a group of hills which rise above the north bank of the Tagus River. This view shows one of the public squares of the capital. The broad mouth of the Tagus gives the city an excellent harbor and has led to its development as an important port

PORTUGAL

This country is lower than most of Spain, and, since it borders the Atlantic Ocean, it has more rainfall and a milder climate than Spain. The fertile land is well adapted to agriculture, and grapevines are cultivated on a large scale. Many of the hillsides are used for pastures.

Natural regions. In the north the land is hilly near the coast but rises inland to mountain ranges. Near Oporto and extending southward there is a narrow coastal lowland. This lowland is bordered on the east by the western margin of the Iberian Plateau. There is another lowland area about the mouth of the Tagus River.

Fig. 421. This man and his wife have a vineyard on the warm, sunny slopes of the Douro River, where they raise grapes and make wine. They are taking a cask of wine by ox-cart to Oporto, where they will sell it to a wine merchant who buys the products of the Douro vineyards for export

North and south of this lowland area the mountains on the western margin of the plateau come to the coast.

Oporto, the seaport and industrial center of northern Portugal, is near the mouth of the Douro River, and the wines manufactured in the Douro district are shipped from this city (Fig. 421). There are cotton and woolen mills in the city, and it is also the home of many fishermen. Farther south in Portugal are the wonderful cork forests which have led to an industry of very great importance. The United States imports millions of dollars' worth of cork each year, mostly from Portugal.

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Fig. 422. The men in this picture are threshing wheat in the fertile lowlands of the Tagus River. The threshing machine is in the background. Notice the nets with which the carts are fitted, to prevent the grain from falling off. What other products do the farmers of the Tagus lowlands raise?

Wheat, rice, olives, lemons, figs, and grapes are grown on the lowlands in the vicinity of the Tagus River (Fig. 422). In the hills bordering this lowland there are copper deposits. **Lisbon,** located on the Tagus, twelve miles above its mouth, is the industrial center of southern Portugal and the capital of the republic (Fig. 420). It contains iron works, woolen factories, and shipbuilding yards. Sardine factories are common in this part of Portugal. Sardines form one of the chief sources of food, and many of the children carry them about in baskets to sell. The growth of Lisbon is due to its position on the Tagus, its nearness to the cork forests, and the importance of the sardine factories.

Foreign possessions. The Portuguese were once explorers and visited many foreign shores. *See Appendix, Plate A.* To-day Portugal has small colonies in Asia and larger possessions in Africa (p. 229); the Azores, Madeira, and the Cape Verde Islands, off the west coast of Africa, belong to Portugal.

Problems and review questions. 1. Why does Portugal have a milder climate, with more rainfall, than Spain? 2. How are the hillsides in Portugal used? 3. What is cork? 4. Why should this country be a good region for raising grapes, lemons, figs, and olives? 5. What are the two chief cities of Portugal? 6. Where are the Portuguese colonial possessions?

Fig. 423. Lake Maggiore is one of the most beautiful sheets of water in Europe. Locate this lake on your map. To what group of mountains do the peaks in this picture belong? Notice in the foreground the picturesque washing-cart which the Italian women push into the water in order to do their washing

Fig. 424. The gardens of the Vatican Palace at Rome are very large and beautiful. This palace is the residence of the Pope and takes its name from the hill upon which it is built. In the background of this view rises the dome of St. Peter's, the great Roman church which stands close by the Pope's palace

ITALY

Physical features and climate. The chief lowland of Italy is in the valley of the Po. Here the rivers have filled in the upper end of the Adriatic Sea with fine materials from the bordering mountains and made a broad, fertile plain. The summers are warm throughout this lowland, but in the west, near Milan and Turin, the winters are cold. The presence of the sea causes mild winters in the vicinity of Venice and Padua. The rainfall near Milan is about 40 inches a year and near Venice about 30 inches.

The south slope of the Alps belongs to Italy. Here there are magnificent peaks, great, deep canyons, and many beautiful lakes (Fig. 423). The mountains keep off the cold winds from the north, and therefore the valleys on the south slope of the Alps are warmer than those on the north slope.

The Alps curve southward, and at the point where they reach the Mediterranean Sea the Apennine Range begins. This range follows the coast of the Gulf of Genoa and then turns southward through the central portion of the Italian Peninsula. These mountains commonly have elevations of from 5000 to 8000 feet above the sea. They are not high enough, in the latitude where they are located, to have an extremely cold climate. Their elevation is sufficient to cause the winds to give up moisture, and there is enough rainfall to support forests. In the southern portion of Italy the temperature seldom falls as low as the freezing point.

The narrow coastal lowlands on the east and west of the Apennine Mountains never have very cold weather, and during the summer the temperature is usually 70° F. or higher.

Sardinia, Sicily, and a number of smaller islands in the Mediterranean belong to Italy. Sardinia is for the most part mountainous, but there is a little lowland area in the southwestern part of the island, and in the valley bottoms there are lands that can be cultivated with the help of irrigation.

Fig. 425. This picture of Mt. Vesuvius was taken when the volcano was in eruption. The dark cloud which it sends forth is made up of steam, ashes, and bits of lava

Sicily is an extension of the Apennine Range and was formerly connected with the mainland. In the narrow Strait of Messina, which separates the island of Sicily from the Italian Peninsula, there are great cracks in the earth where the lands often slip a little and thus cause earthquakes.

Mt. Etna, which is an active volcano, is in Sicily, and Mt. Vesuvius, one of the most famous active volcanoes in the world, is located near the Bay of Naples (Fig. 425). The earthquakes and volcanoes which are common in this region indicate that the Apennine Mountains are young and that they are still growing.

ATLANTIC OCEAN
Bay of Biscay
MEDITERRANEAN SEA
FRANCE
SPAIN
PORTUGAL
GERMANY
SWITZERLAND
AUSTRIA
ITALY
MOROCCO
ALGERIA
TUNISIA
Paris
Madrid
Lisbon
Rome
Algiers
Tunis
Rabat
Marseille
Barcelona
Valencia
Bordeaux
Toulouse
Lyon
Strasbourg
Stuttgart
Munich
Bern
Geneva
Milan
Turin
Venice
Genoa
Florence
Naples
Palermo
Tripoli
Oporto
Seville
Granada
Malaga
Cadiz
Gibraltar (Br.)
Tangier
Ceuta
Tetuan
Melilla
Oran
Algiers
Constantine
Bougie
Philippeville
Bizerta
Sfax
Susa
Kairwan
Tebessa
Biskra
Tuggurd
Wargla
Ain Sefra
Morocco
Fez
Mekinez
Casablanca
Mazagan
Mogador
Agadir
Tarudant
Timbuktu
Mediterranean Sea
Corsica
Sardinia
Cagliari
Sassari
Bastia
Ajaccio
Balearic Islands
Palma
Minorca
Iviza
Majorca
Toulon
Nice
Cannes
Monaco
Gulf of Genoa
Gulf of Lion
Gulf of Valencia
Gulf of Gabes
Shott el Jerid
Shott el Melghir
Shott esh Sharqui
Shott el Hodna
Shott el Gharbi
Sahara
Atlas Mts.
Pyrenees Mts.
Alps
Apennines
Black Forest
Vosges Mts.
Jura Mts.
Cevennes
Auvergne
Mt. Dore
Mt. Cenis
Mte. Rosa
Mt. Blanc
Gotthard
Lake Constance
Danube R.
Rhine R.
Rhone R.
Po R.
Arno R.
Tiber R.
Loire R.
Seine R.
Garonne R.
Ebro R.
Douro R.
Tagus R.
Guadiana R.
Guadalquivir R.
Segura R.
Jucar R.
Ebro R.
Rhone R.
Medjerda R.
Shelif R.
Mulucha R.
Sebu R.
Um er Rebia R.
Tensift R.
Draa R.
Senegal R.
Niger R.
Lake Chad
Canary Islands
Madeira Is.
Azores
Cape Finisterre
Cape St. Vincent
Cape Roca
Cape Spartel
C. Trafalgar
C. Palos
C. Gata
C. Bon
C. Blanc
Gibraltar
Strait of Gibraltar
Strait of Bonifacio
Sicily
Malta
Trapani
Marsala
Girgenti
Pantelleria I.
Lampedusa I.
Ustica I.
Ischia I.
Elba I.
Sardinia
Corsica
Balearic Islands
Majorca I.
Minorca I.
Iviza I.
Formentera I.
Alboran I.
Perejil I.
Habibas Is.
Chafarinas Is.
Peñon de Velez
Peñon de Alhucemas
Melilla
Ceuta
Tangier
Tetuan
Gibraltar (Br.)
Neutral Zone
Spanish Territory
Europa Pt.
Carnero Pt.
Tarifa
Algeciras
La Linea
San Roque
Los Barrios
Pta. Leona
Almina Pt.
Alboasa Pt.
Mt. Verde
C. Negro
Tetuan R.
Guadiaro R.
Palmones R.
Barbate R.
Janda L.
Castellar
Scale, nine times that of main map
Scale, three times that of main map
Adrianople
Kirk Kilisseh
Lule Burgas
Demotika
Dedeagatch
Enos
Rodosto
Eregli
Tchorlu
Tchataldja
Constantinople
San Stefano
Skutari
Kadiköi
Ismid
Gulf of Ismid
Princes Is.
Sea of Marmora
Marmora I.
Gallipoli
Gulf of Saros
Samothrace I.
Imbros I.
Tenedos I.
Ruins of Troy
Kale Sultanieh
Dardanelles
Suvla Bay
Artaki Gulf
C. Kara
C. Boz
Panderma
Bigha
Mudania
Gemlik
Isnik
Isnik L.
Brusa
Mamiyas L.
Sakaria R.
Black Sea
Mizda
Ardas R.
Erkene R.
Maritza R.
Bosporus
Riva
Pera
Europe
Asia
Coal, iron & steel goods, cotton, wheat from Europe, U.S. and South America
Rubber, cacao, fruits from Africa; resupplied Europe and U.S.
Coal, iron & steel goods, fish from Europe, U.S. & South America
Wheat, wool, dates, fruits from Australia
Raw silk, tea, hides, cotton from Asia
Wheat, wool from Russia
Coal, cotton, textiles, machinery from Europe and U.S.
Cotton from India and Egypt
Cotton goods, furniture, sugar, coal from France
Coal from U.K.
Cotton, wheat from U.S.
Flour, coal, sugar, machinery from France and U.K.
Phosphates, olive oil, dates to France & U.K.
Macaroni, fruits, vegetables to Europe & U.S.
Copper to Europe
Wheat
Dates
Settled boundaries
Unsettled boundaries

Longitude East from Greenwich
Danzig
Warsaw
Moscow
Cape Town
Lourenço Marques
Budapest
Belgrade
Bucharest
Sofia
Constantinople
Athens
Salonika
Smyrna
Adrianople
Skutari
Brusa
Angora
Eskishehr
Konia
Adana
Aleppo
Damascus
Beirut
Jerusalem
Jaffa
Alexandria
Cairo
Port Said
Suez
Tripoli
Latakia
Haifa
Acre
Nazareth
Amman
Deraa
Homs
Palmyra
Baalbek
Aintab
Urfa
Marash
Malatia
Kaisarieh
Sivas
Erzurgan
Erzerum
Trebizond
Batum
Poti
Kutais
Tiflis
Stavropol
Ekaterinodar
Novorossiisk
Feodosia
Kerch
Simferopol
Sevastopol
Yalta
Odessa
Nikolaiev
Kherson
Berdyansk
Kishinev
Galatz
Brailа
Constantza
Chernavoda
Turnu Severin
Ploesci
Craiova
Giurgevo
Rustchuk
Silistria
Varna
Shumla
Pleyna
Tirnova
Burgas
Philippopolis
Dedeagatch
Seres
Kavala
Monastir
Ochrida
Uskup
Prisrend
Novibazar
Mostar
Sarajevo
Banjaluka
Brod
Osijek
Subotica
Szegedin
Debreczen
Miskolcz
Kaschau
Munkacz
Bratislava
Vienna
Prague
Berlin
Warsaw
Danube R.
Black Sea
Aegean Sea
Ionian Sea
Adriatic Sea
Mediterranean Sea
Sea of Marmora
Gulf of Adalia
Gulf of Sidra
Gulf of Suez
Gulf of Akaba
Red Sea
Nile R.
Euphrates R.
Tigris R.
Dead Sea
Sea of Galilee
Mouths of the Danube
Mouths of the Nile
Suez Canal
Crimea
Caucasus Mts.
Mt. Elbruz
Mt. Sinai
Pyramids
Sinai Peninsula
Hejaz
Arabian Desert
Libyan Desert
Cyrenaica (Barka)
Tripolitania
Italy
Sicily
Crete
Cyprus (British)
Rhodes
Lemnos
Samothrace
Imbros I.
Tenedos
Gallipoli
Dardanelles
Bosporus
Sea of Marmara
Sakaria
Kizil
Euphrates R.
Eastern Euphrates
Mt. Olympus
Mt. Pelion
Mt. Ossa
Mt. Pindus
Mt. Taygetus
Mt. Parnassus
Mt. Cithaeron
Mt. Hymettus
Mt. Pentelicus
Mt. Lycabettus
Mt. Ida
Mt. Dikte
Mt. Lassithi
Mt. Olympus
Mt. Ida
Mt. Lycaonia
Mt. Taurus
Mt. Lebanon
Mt. Hermon
Mt. Carmel
Mt. Gilboa
Mt. Tabor
Mt. Nebo
Mt. Sinai
Mt. Horeb
Mt. Seir
Mt. Hor
Mt. Pisgah
Mt. Gerizim
Mt. Ebal
Mt. Zion
Mt. Olivet
Mt. Scopus
Mt. Moriah
Mt. Gilead
Mt. Ephraim
Mt. Judah
Mt. Benjamin
Mt. Naphtali
Mt. Asher
Mt. Zebulun
Mt. Issachar
Mt. Manasseh
Mt. Reuben
Mt. Gad
Mt. Dan
Mt. Simeon
Mt. Levi
Mt. Judah
Mt. Benjamin
Mt. Ephraim
Mt. Manasseh
Mt. Issachar
Mt. Zebulun
Mt. Naphtali
Mt. Asher

MAP STUDIES

(Use map between pages 207 and 210)

1. What continents border the Mediterranean Sea? 2. What three large European peninsulas extend into the Mediterranean Sea? 3. What is the Atlantic gateway into the Mediterranean Sea called? 4. About how wide is that gateway?

5. Describe an imaginary journey from the Mediterranean to the Black Sea. 6. How do vessels pass from the Mediterranean to the Red Sea? Describe the landscape seen on that journey. 7. Name four navigable rivers that flow into the Mediterranean Sea; four that flow into the Black Sea.

8. Make a list of the countries that border on the Mediterranean Sea; of those that border on the Black Sea. 9. Make a list of the chief seaports on the Mediterranean Sea. Opposite each name place the name of the country in which that seaport is located.

10. What are the chief seaports on the Black Sea? 11. Make a list of the chief exports from the European cities on the Mediterranean Sea. 12. Which of these exports suggest a warm climate for southern Europe? 13. What are the chief exports from the Black Sea ports?

14. What are the chief products shipped from African ports on the Mediterranean Sea? 15. What port, east of Athens, ships large quantities of figs? 16. What important Atlantic seaports are shown on this map?

17. Where are the great cork-oak forests in Portugal? 18. Where are the mining districts in Spain? the grazing districts? the chief fruit-raising districts? 19. What are the chief products of the lowlands in the valley of the Po?

20. Where in Italy are there vineyards? marble quarries? 21. What does the United States receive from Sicily? 22. Judging from the products of Jugoslavia, Greece, Albania, and Bulgaria, what should you think must be the chief occupations of the people in those countries?

23. What are the chief products of Palestine and Syria? 24. Where are the date-producing regions near the Mediterranean Sea? 25. Trace the meridian of 0° on this map.

26. Compare the latitude of New York with that of Rome.

Fig. 426. These Italian boys and girls are picking grapes in a vineyard on the slopes of the Apennines, where the dry summers are especially favorable to the ripening of the fruit. Why are such large areas in Italy devoted to the cultivation of vineyards? What other products do the Italians raise?

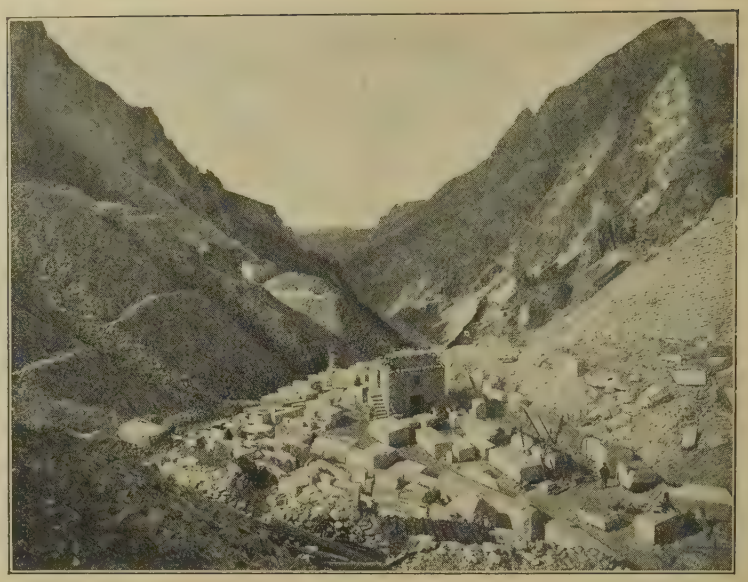

Fig. 427. This is one of the quarries at Carrara from which the beautiful Italian marble is obtained. Locate Carrara on the map between pages 181 and 184. In what natural region is it? Italian marble has been used in the construction of many of the finest buildings in the United States

Home work. 1. Find out all you can about the burial of the cities of Herculaneum and Pompeii. 2. Read a full account of Vesuvius in the best reference book available.

Resources and occupations. The soils, the forests, the marbles in the mountains, and the fisheries about the coast are the chief natural resources. Italy is a land without great variety in mineral wealth. Sulphur is obtained in Sicily. In the islands of Elba and Sardinia there are iron mines. Some iron is obtained from the Alps. The water-power furnished by the mountain streams makes up somewhat for the lack of coal.

In the north, on the lower slopes of the Alps, olives, grapes, mulberries, and figs are raised, and on some of the higher slopes there are pastures for cattle, sheep, and goats. The lakes in the mountain valleys of this part of Italy attract many tourists and many who seek rest or health, and the care of such visitors furnishes occupation to many people.

The Plain of the Po is the most important agricultural and industrial region of Italy, and the most densely settled district. The streams from the mountains furnish water for irrigation. Wheat, rice, corn, and many other crops are raised. The absence of coal and the cost of transportation to other parts of Europe are disadvantages, and yet this region has become an important industrial district. Milan, Turin, and Venice are the principal cities.

In many places the forests have been cleared from the slopes of the Apennine Range, and the hillsides have been terraced for agriculture or planted with olive, orange, or lemon trees. Many groves of chestnut trees have been planted, and the nuts from these trees are used as a food. Grapevines grow in such luxuriance in

this part of the country that Italy has become one of the leading countries in the production of wine (Fig. 426). Cattle, sheep, and goats are raised on the higher pastures of the range. In the Apennine Mountains, at Carrara and Siena, there are immense quarries where large quantities of beautiful marble are obtained (Fig. 427).

On the lowland bordering the Adriatic Sea hard wheat is raised. This wheat is used in the manufacture of macaroni. The wheat is shipped chiefly to Naples, which is the center of the macaroni industry, and additional supplies are imported from Russia and South Australia. The Italians manufacture about six million dollars' worth of macaroni each year, and large quantities of it are shipped to the United States.

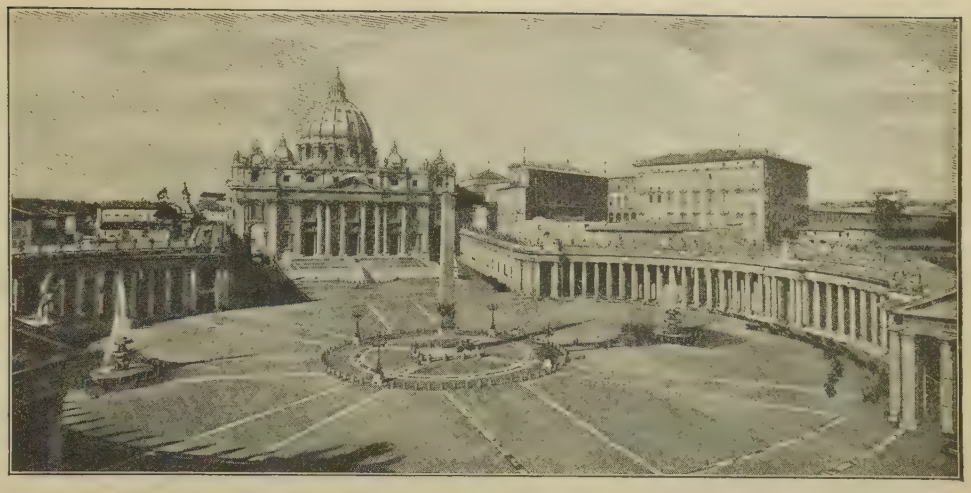

Fig. 428. St. Peter's Church at Rome is located on the Vatican Hill, and close by, at the right in this view, is the Vatican Palace. St. Peter's is a very old church, and like the Vatican Palace it contains many beautiful paintings by Michelangelo, the great Italian artist. Locate Rome on your map. Why is the population less than it was when the city was the capital of the Roman Empire?

In the southern portion of Italy the forests have been largely removed, the hillsides are barren, and the population is sparse. Here there are a few fishing centers, and many of the native people are engaged in hunting for coral and tortoise shells, which they bring back to Naples and Genoa to be manufactured into ornaments.

Sicily. The climate and surface features of Sicily are much like those of southern Italy, and therefore the crops resemble those of the mainland. Some wheat is grown, the grapevine flourishes, and orange and lemon trees are cultivated. The sulphur mines of Sicily are on Mt. Etna, where a part of the sulphur gas, coming out of the earth, cooled quickly, forming a solid.

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Fig. 429. This is a typical scene in the old quarter of Genoa, where the streets are narrow and the houses are set close together. What are the exports and imports of Genoa?

Cities. Naples is the largest city in Italy. It is located near a fertile lowland where a very dense population is supported. The climate is warm in this lowland area, and most of the people lead an agricultural life. Nearly all of the inhabitants of this region make their homes in the villages near the coast and go into the country each day to work on their farms.

Palermo is the principal city south of Naples. It is the capital of Sicily and is in the midst of a rich fruit-growing district.

Rome is the capital of the kingdom of Italy. It is located on low hills near the Tiber River and on the inner margin of a small coastal plain. In the days of the ancient Roman Empire this city had a population of at least a million, and the bordering lowland was all under cultivation. To-day the population is about 500,000. The surrounding plains are almost deserted, for they are unhealthful places where malaria is easily contracted.

In the city there are many beautiful residences and several magnificent buildings. St. Peter's Church, the largest church in the world, and the Vatican, the home of the Pope, are in Rome (Fig. 428). Many of Michelangelo's most beautiful paintings are in the Vatican.

Florence is an inland city in a district where large quantities of silk are produced and manufactured. Mosaic work and the plaiting of straw are also important industries here. Some of the most valuable art treasures in the world are in the museums of Florence. The Italians are an artistic people and may justly be proud of their work in architecture, painting, and sculpture. Their museums are all great storehouses of art, and many of their manufactured goods are distinctly artistic.

Milan and **Turin** are the industrial and trading centers in the western portion of the northern lowland. They are on the highways of travel east and west and north and south. Large quantities of silk cloth are manufactured in Milan.

Genoa, the chief seaport in northern Italy, is the outlet for many of the products raised or manufactured in the valley of the Po. It is the birthplace of Columbus.

Fig. 430. This is a view in the harbor of Trieste. This city came into the possession of Italy at the end of the World War in 1918, and is one of the most important ports on the Adriatic Sea. Locate Trieste on the map between pages 207 and 210. Compare the east and west shores of the Adriatic Sea. Why has Italy so few Adriatic ports?

Venice and **Trieste** (Fig. 430) are important Italian seaports at the head of the Adriatic Sea. Venice is a city built on more than one hundred islands. Centuries ago, when barbarian hordes were invading Italy, a group of people fled to these islands for safety. Later their sailors proved to be so skillful and their business men so enterprising that much of the travel and commerce between Europe and Asia went through Venice, which thus grew to be a prosperous and wealthy city. There are over one hundred canals in the city and over four hundred bridges. The canals take the place of streets, and boats are used instead of wagons or automobiles (Fig. 432).

Government. Italy is a limited, or constitutional, monarchy, and the ruler is a king. The people elect a large number of the members of the parliament and are thus directly represented in the government of the nation.

Fig. 431. Fiume is another busy seaport on the eastern side of the Adriatic Sea. Fiume is now an independent state, but the port and the railroads leading to it are governed in such a way as to make it possible for the people of Jugoslavia to make use of it in their trade by sea with other nations

Foreign possessions. Eritrea, Italian Somaliland, and Libia, which are in Africa, are possessions of Italy (p. 229). Italy also administers the affairs of a small region on the northeast coast of the Mediterranean Sea.

San Marino is the smallest and oldest republic in the world. It contains thirty-two square miles and is located east of Florence near the Adriatic Sea. *See map between pages 207 and 210*, F 2.

The **Free State of Fiume** is located on the eastern side of the Adriatic Sea between Italy and Jugoslavia and is an important seaport.

Problems and review questions. 1. Where are the lowlands of Italy? 2. What mountains are there in Italy? 3. Name two active volcanoes in Italy. Where are they located? 4. In what part of Italy is irrigation practiced? 5. What large islands in the Mediterranean Sea are a part of the kingdom of Italy?

6. Is the rainfall heavier on the mountains or on the lowlands? Why? 7. Why is it never very cold in Italy except in the mountains? 8. Why have most of the people of Italy become farmers? 9. What other occupations are followed?

10. What mineral resources are there in Italy and the neighboring Italian islands? 11. What trees are commonly raised in this country? What tree furnishes food for the silkworm? 12. In what products does Italy take leading rank?

13. What food manufactured from wheat is shipped in large quantities from Naples to the United States?

14. From what countries is wheat imported by Italy? 15. What are some of the other imports of Italy? 16. What fruits are raised in Italy?

17. What form of government has Italy? 18. Name five Italian cities and tell something of interest about each one.

Courtesy of Williams, Brown, and Earle

Fig. 432. This is one of the canals or water streets of Venice. At the left are some of the boats known as *gondolas*, which are used by the Venetians in going about the city

19. What foreign possessions has Italy? 20. How are the hillsides in Italy used? 21. What places in Italy are of special historic interest? Why?

Home work. 1. Read a description of the Colosseum and one of the Forum in Rome. 2. Read a description of the destruction of Pompeii by the eruption of Mt. Vesuvius.

JUGOSLAVIA

"Jugoslavia" means *the home of the Southern Slavs.* These people speak several different dialects, but they have many customs and interests in common. They are organized as a limited monarchy and have a king for a ruler.

The Dinaric Alps extend into Jugoslavia, and most of the land is rough or even mountainous. In the valleys there are some lands suitable for agriculture, and in such places rye, oats, barley, and corn are raised. The hillsides are used for planting the grapevine and for growing olive, lemon, orange, and mulberry trees. The oak

Fig. 433. This is one of the public parks in Belgrade, the capital of Jugoslavia. At the right are the buildings of the University of Belgrade. At the junction of what two rivers is Belgrade situated? What advantages for trade can you see in its location? What are the products of the surrounding country?

and beech also grow on these hills, and hogs are fattened on the nuts that fall to the ground. On the higher slopes of the mountains sheep, goats, and cattle are allowed to graze. Some of the herdsmen take their flocks and herds to the higher pastures in summer and bring them into the valleys for the winter.

The forests have made lumbering possible. Coal, iron, lead, silver, and gold have been discovered, but as yet little mining is done.

Belgrade, located on the south bank of the Danube River, is the capital and chief city (Fig. 433). **Monastir** is the principal city in the southern part of Jugoslavia.

By means of the Danube River, trade may be carried on very easily with the people of Austria, Hungary, and Rumania. The valleys of the Morava and Vardar rivers form the best north-and-south route of travel, and a railroad follows this route. From Belgrade there are railroad connections with Constantinople and northwest to the Atlantic and North Sea countries. Trade with the more distant parts of the world is carried on by way of the Black and Mediterranean seas.

Fig. 434. These Jugoslav boys and girls are dressed in their national costumes for the celebration of a holiday. The official name of their country is the Kingdom of the Serbs, Croats, and Slovenes, from the three principal groups of people which make up the nation. But since they are all Jugoslavs (Southern Slavs), their country is commonly called Jugoslavia

The land bordering the Adriatic Sea is mountainous. Fiume is the largest city on this coast; and although it is not within the boundaries of Jugoslavia, the Jugoslavs may make use of it in promoting their foreign commerce. It gives them a good outlet to the Mediterranean Sea.

These people do very little manufacturing and therefore must exchange their fruits, grains, and the products from their flocks and herds for manufactured goods.

ALBANIA

This is a small, mountainous country on the east coast of the Adriatic Sea and south of Jugoslavia (Fig. 435). The mild climate leads to the cultivation of the fruits that grow in the Mediterranean region, and to the raising of some grain. **Durazzo** is the capital.

Many of the people have cattle or sheep and spend their time out on the hillsides with their flocks or herds.

Fig. 435. This is a view on the rocky coast of Albania. This country is so mountainous that agriculture is possible only in the sheltered valleys between the hills. Are the mountains of Albania young and rugged or old and worn down? What are the occupations of the people?

Fig. 436. Most of the large rose gardens of Bulgaria are located on the sheltered southern slopes of the Balkan Mountains. The women in this picture are Bulgarian peasants at work picking the roses. What use is made of these roses? What are the chief agricultural products of Bulgaria?

BULGARIA

The Balkan Mountains extend from east to west through the central portion of Bulgaria. To the north of the mountains the land is hilly but is used for raising wheat and sugar beets. Much of the mountain country is forested, and this has led many to engage in lumbering. Cattle, sheep, and goats are allowed to graze on the hillsides and in the mountains.

South of the Balkan Mountains the climate is very mild, and large quantities of roses, grapes, and plums are raised. The rose gardens are among the largest in the world, and the blossoms are used in the production of attar of roses (Fig. 436).

Sofia and **Philippopolis** are on the railroad from Vienna to Constantinople. Sofia is the capital of the kingdom of Bulgaria, but Philippopolis, on the Maritza River, is the largest city and a busy industrial and commercial center. **Varna** is the chief seaport. Large quantities of wheat and other grains are shipped from Varna each year.

Fig. 437. This is a street scene in the city of Corfu, on the island of the same name. The man at the right is a pottery merchant. He piles up his wares in the street and sells them to the passers-by. Locate Corfu on the map between pages 207 and 210. To what country does the island belong?

GREECE

This country extends so far south into the Mediterranean Sea that the climate is always mild. During the hot summer season much of the vegetation withers, and irrigation is necessary to secure regular crops. On the western side the evergreen trees of the Mediterranean region grow, and olive, orange, lemon, fig, and mulberry trees are grown. The grapevine grows luxuriantly in this part of Greece. Small, seedless grapes are produced in abundance, which, when dried, are known as currants.

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Fig. 438. The flat-topped hill which rises above the modern city of Athens is called the Acropolis and was the citadel, or fortress, of the ancient city. This view of Athens was taken from the Acropolis. At the left you can see the ruins of one of the beautiful old Greek temples

The irregular, indented coast line and the many islands of Greece favor free communication between the peoples of this peninsula and those of the other countries bordering the Mediterranean Sea, and have led to an extensive development of commerce.

Since the World War, Greece has obtained possession of nearly all the islands of the Ægean Sea, and at present controls the port of Smyrna with a large surrounding area on the coast of Anatolia. *See page 235.*

Athens, the capital of the kingdom of Greece, is built about the base of a tablelike hill (Fig. 438). It was the center of the ancient Greek civilization. In the modern part of Athens there are wide streets and buildings much like those of other European capitals, but the city is rich in the ruins of ancient temples. **Piræus**, the port for Athens, is the city through which most of the foreign commerce of Greece is carried on. In the northern part of the country is the important port of **Saloniki**, located at the head of the gulf of the same name. Saloniki is the southern terminus for the railroad which runs from Vienna southward through Budapest and Belgrade to the Ægean Sea (Fig. 439).

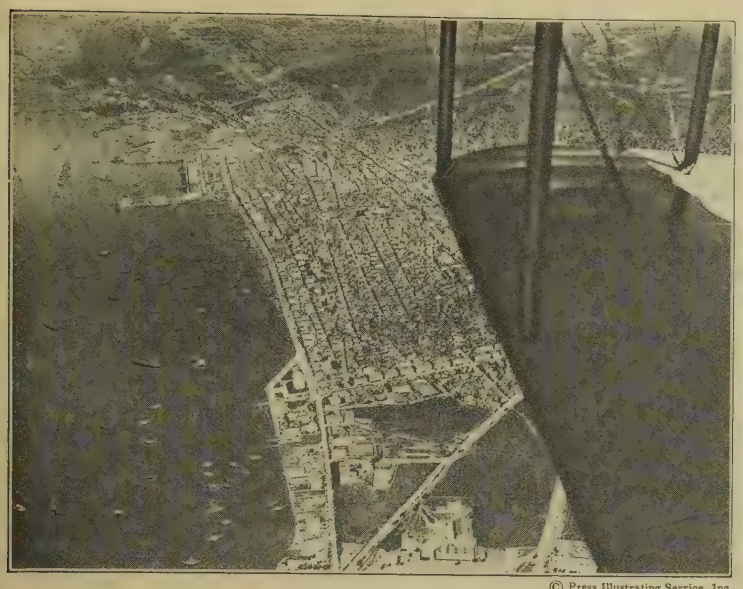

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Fig. 439. This is a view of the Greek city of Saloniki. The picture was taken from an aëroplane. At the right you can see one of the wings of the aëroplane, and far below is the water front of the city. The little white spots at the left are boats in the harbor

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Fig. 440. This is a view of Constantinople from the north. The city is very old. It was founded by the Greeks six hundred and fifty years before the birth of Christ. Later it was conquered by the Romans, and finally it fell into the possession of the Turks

CONSTANTINOPLE AND THE TURKS

Constantinople is a city located on the highway of travel by land from Asia to Europe and on the water route from the Black Sea to the Mediterranean Sea (Figs. 440, 441). Large numbers of Turks live in this city and in the territory immediately surrounding it. In addition to the Turks, its inhabitants include many Greeks, Armenians, and other foreigners.

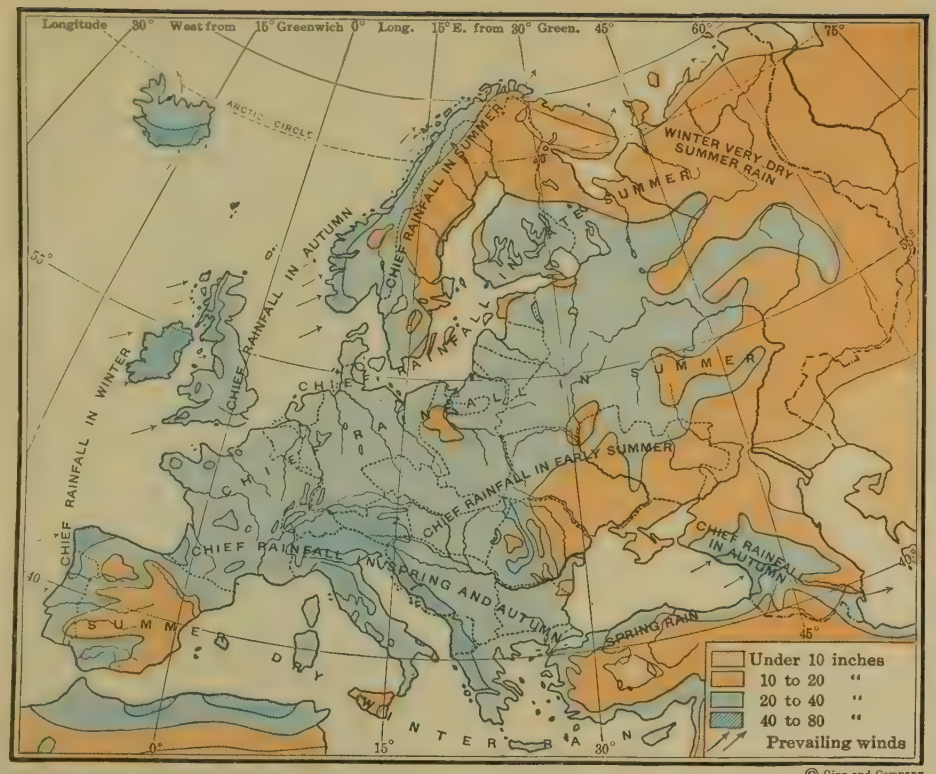
For centuries Constantinople has been the capital of the Turkish Empire, most of which is in Anatolia. In this way the Turks have controlled the land on both sides of the narrow straits which separate Europe from Asia. By means of forts located along the shores they have commanded the very important water route from the Black Sea to the Mediterranean Sea. Since the World War the Turks have been allowed to remain in possession of Constantinople, but the Bosporus, the Sea of Marmora, and the Dardanelles are no longer under their control, and are open to the ships of all nations.

Problems and review questions. 1. What countries are included in the Balkan Peninsula? 2. Describe briefly the physical features of these countries. 3. What are the chief natural resources and to what occupations have they led? 4. What other natural resources await development?

5. What products have the people of these countries to export?
6. Why are these countries not great manufacturing centers?
7. In what Balkan country are large quantities of roses raised?
8. What city in Greece was the center of an ancient civilization?
9. Name and locate the capital of each of the Balkan countries.
10. What people have possession of the city of Constantinople?
11. Why should the Bosporus, the Sea of Marmora, and the Dardanelles be kept open for the use of ships of all nations?

Courtesy of Williams, Brown, and Earle

Fig. 441. The harbor at Constantinople is a very busy place. Steamships from the Mediterranean and the Black Sea may be seen loading and unloading their cargoes. In the small boats are the boatmen who earn their living by carrying passengers ashore. Constantinople is located at the meeting point of two seas and two continents. What are the two seas? the two continents? Why is such a location of great commercial importance? From what Black Sea ports may some of the ships in this view have come? What nations depend upon the use of the straits at Constantinople for their trade by sea?


Longitude 30° West from 15° Greenwich 0° Long. 15° E. from 30° Green.
ARCTIC CIRCLE
CHIEF RAINFALL IN WINTER
CHIEF RAINFALL IN AUTUMN
CHIEF RAINFALL IN SUMMER
WINTER VERY DRY SUMMER RAIN
SUMMER RAIN
CHIEF RAINFALL IN EARLY SUMMER
CHIEF RAINFALL IN SPRING AND AUTUMN
CHIEF RAINFALL IN AUTUMN
SPRING RAIN
SUMMER DRY
WINTER RAIN
Under 10 inches
10 to 20 "
20 to 40 "
40 to 80 "
Prevailing winds
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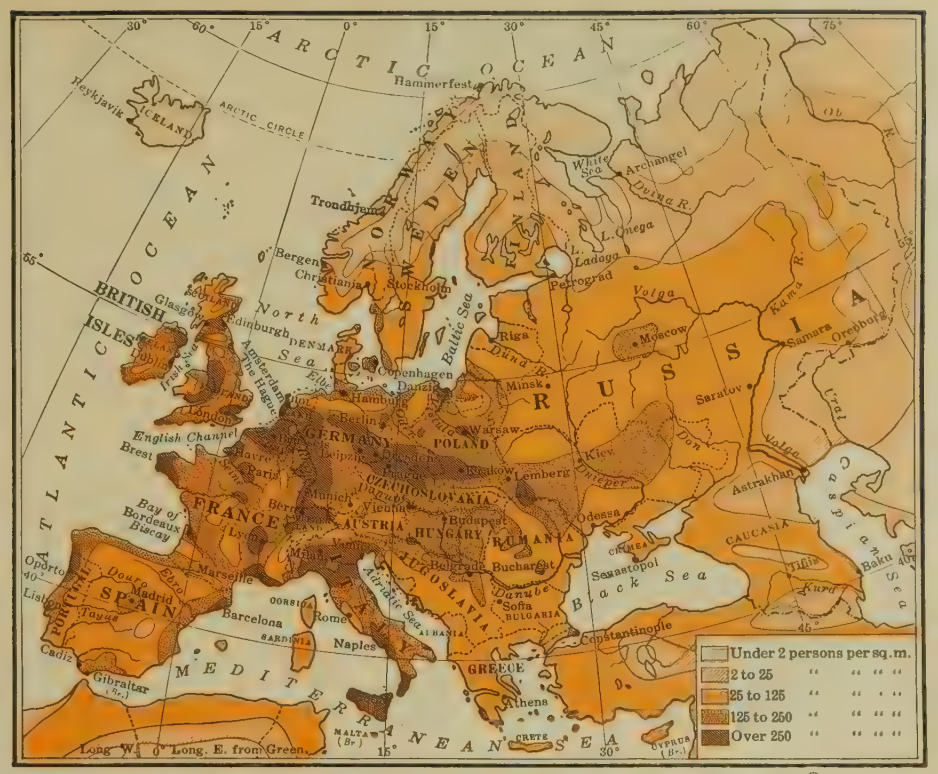
Average annual rainfall in Europe



Distribution of people in Europe

COMPARATIVE MAP STUDIES

1. How do you explain the many blocks of ice in the ocean on the north? 2. What portion of Europe is below sea level and not covered with water? 3. What must be the elevation of the Caspian Sea relative to sea level? *See map on page 201.*

4. Explain the numerous lakes that appear in Finland and parts of northwestern Russia and in the Scandinavian Peninsula. 5. What other continent is similarly supplied with lakes? 6. What portions of Europe should you judge from these maps are best suited to agriculture?

7. What countries in Europe must have great water-power resources? 8. How do you explain the fact that there is so little rainfall in the extreme north of Europe? 9. Why should there be more rainfall on the western coast of Europe than in eastern Russia? 10. What winds bring most of the rain to this continent?

11. Why do the trees decrease in the north and little but mosses and grasses grow on the tundra bordering the Arctic Ocean? 12. How do you explain the very heavy rainfall in the Alps? 13. What kinds of vegetation should you expect to find on the high mountains?

14. The wide distribution of the temperate forests has supplied timber to most parts of the continent. 15. In central Europe there are many small areas that receive heavy rainfall. Explain this. 16. Why is there so little rainfall in the region of the Caspian Sea? 17. Why are certain of the mountain ranges forested and others almost bare? 18. Why should there be treeless areas in Europe?

19. The relief and vegetation map shows the summer conditions. If another map were made to show the winter conditions, there should be a great deal more ice shown in the north; Iceland should be covered with snow; all of northwestern and northern Europe should be snow-covered; the harbors, bays, and gulfs of the Baltic Sea should be shown as frozen over; the whole of the White Sea should be shown as closed by ice; the extensive grasslands south of the winter snow, where there are so many farms, should have little that is green upon them.

20. Are there more people living on the plains, the uplands, or among the mountains in Europe? 21. What advantages do the lowlands offer? 22. Why are there so many people living in the northern part of Italy between Venice and Milan? in the valley of the Rhine? in southern Germany?

23. Why are there so few people living north of the Caspian Sea? in northern Russia and Finland? along the boundary between Norway and Sweden?

24. Why have certain great industrial centers developed in Europe? Test your answers by an examination of the economic maps. 25. What portions of Europe are best adapted to support a large population?

Scale of miles
0 100 200 300 400 500
Water less than 500 feet deep
Land below sea level
Floating ice
Glacial ice
Tundra
Grasslands
Temperate forests
Semideserts
Deserts and barren mountain slopes
Oases
EUROPE

AFRICA

INTRODUCTION

Little by little the lands and the waters of the earth have been explored. *See Appendix, Plate A.* The nations of Europe wanted more land where their people could go and settle. They needed more raw materials for their great factories, and new markets for their manufactured goods. Most of Africa has now come into the possession of European powers.

Fig. 442. In this view you can see the southwest tip of Africa near the Cape of Good Hope. The cape was discovered in 1487 by the Portuguese explorer, Diaz. He met such terrible gales here that he called it the Stormy Cape, but later a Portuguese king gave it its present name

Size and position. Africa is the second largest continent in the world. *See map on page 275.* It is about 5000 miles long and is three times the size of Europe. At the Strait of Gibraltar Africa is separated from Europe by just nine miles of water, and at the Strait of Bab-el-Mandeb, or Gate of Tears, it is only 14 miles from Asia. The connection with Asia at the Isthmus of Suez was complete until the great Suez Canal was constructed (Fig. 443). Up to that time European ships had to go around the Cape of Good Hope to reach India (Fig. 442).

Exploration. The location of Africa was known long before North or South America was discovered, but the two western continents were explored and settled long before much of Africa had been even seen by white men.

Africa is a difficult land to explore. The coast line is regular and there are few good harbors. *See map opposite page 230.* Most of the rivers have falls or rapids near their mouths, which make it difficult to get into the country, for explorers usually enter a country by the rivers.

Furthermore, those who tried to reach the interior encountered many wild tribes of natives, and in portions of the country they found hot, damp, malarial conditions. On the north the Sahara is a barrier to travel, and near the equator is a tropical jungle, which is one of the most difficult places in the world to explore. The large animals and the many injurious insects of Africa have also helped to make that continent the least attractive to the traveler, and as long as there was opportunity for acquiring land in the Americas, little was done to colonize Africa.

People. In northern Africa the inhabitants are chiefly descendants of Arabian people who migrated westward from Asia, or of European people who crossed the Mediterranean Sea to settle in this continent. These northern people, with the exception of the Turks, belong to the white race. The Turks are of Mongolian descent and belong to the yellow race. The native people of Abyssinia belong to the white race. They are large, strong, liberty-loving people, who in their mountain country have maintained their independence even to this day.

Nearly all the negro people of Africa live in the equatorial region or farther south. The negroes are the best laborers in the tropical countries, for white men are not able to live and work hard for many years in the hot, damp parts of the earth. The negroes should be trained

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Fig. 443. The Suez Canal was cut through the isthmus between Asia and Africa to connect the Mediterranean Sea with the Red Sea. It was opened in 1869 and is ninety-eight miles long. To what countries of the world is it of the greatest benefit? *See Appendix, Plate B*

AFRICA
PHYSICAL MAP
SHOWING NATURAL REGIONS
Scale of statute miles
0 100 200 300 500 750 1000 1500
Scale of kilometers
0 200 400 600 1000 1500 2000
Lowlands
Uplands and plateaus
Congo Basin
Old, worn-down mountains
Young, rugged mountains
Average summit elevations in natural regions indicated thus: 500 to 1000 ft.
Comparative Area
El Paso
TEXAS
265,896 sq. m.
Galveston
REDFIELD-KENDRICK-ODELL CO., N.Y.
EUROPE
ASIA
ATLANTIC OCEAN
INDIAN OCEAN
MEDITERRANEAN SEA
BLACK SEA
CASPIAN SEA
ARABIA
ANATOLIA
EGYPT
LIBYA
ALGERIA
MOROCCO
ATLAS MTS.
SAHARA TABLELAND
Libyan Desert
Nubian Desert
Arabian Desert
Desert el Areg
Igidi Desert
El Juf
Tibesti Mts.
Ahaggar Mts.
Marra Mts.
Kaokar Mts.
Abyssinian Highlands
Adis Abeba
Somali Peninsula
Kenya Colony
Mt. Kenya
Mt. Kilimanjaro
Mt. Elgon
Mt. Ruwenzori
Mt. Cameroon
Tibesti Mts.
Sudan
Anglo-Egyptian Sudan
French West Africa
Belgian Congo
Congo Basin
Plateaus of Angola
Tanganyika Territory
Union of South Africa
Southwest Africa
Bechuanaland
Basutoland
Swaziland
Madagascar
Central Plateau
Eastern Highlands
Nile Delta
Suez Canal
Isthmus of Suez
Sinai Pen.
Gulf of Suez
Gulf of Aden
Gulf of Guinea
Gulf of Persia
Red Sea
Mozambique Channel
Lake Chad
Lake Victoria Nyanza
Lake Tanganyika
Lake Nyasa
Lake Rudolf
Lake Tana
Lake Albert
Lake Edward
Lake Ngami
Lake Bangweolo
Lake Moero
Lake Stefanie
Lake Rukwa
Lake Mweru
Lake Kioga
Victoria Falls
Stanley Falls
Livingstone Falls
Stanley Pool
Boma
Loanda
Brazzaville
Timbuktu
Dakar
Cape Verde
Cape Blanco
Cape Palmas
Cape Three Points
Cape Frio
Cape Negro
Cape Town
Cape of Good Hope
Cape Agulhas
Algoa Bay
Port Elizabeth
Durban
Delagoa Bay
Lourenco Marques
Beira
Mozambique
Sofala Bay
Zanzibar I.
Dar es Salam
Mombasa
Tabora
Khartum
Fashoda
Aswan
Cairo
Alexandria
Tripoli
Algiers
Tunis
Rabat
Lagos
Monrovia
Freetown
Timbuktu
Windhoek
Walfish Bay
Angra Pequeño (Lüderitz Bay)
Kimberley
Johannesburg
Pretoria
Bloemfontein
Orange R.
Vaal R.
Limpopo R.
Zambezi R.
Kafue R.
Kwanza R.
Congo R.
Niger R.
Nile R.
Tigris R.
Euphrates R.
Gambia R.
Senegal R.
Volta R.
Benue R.
Shari R.
Juba R.
Sobat R.
Blue Nile
White Nile
Atbara R.
Rovuma R.
Lukuga R.
Ruvuma R.
Mozambique Channel
Madagascar
Tananarivo
Comoro Islands
Seychelles Is.
Amirante Is.
Aldabra Is.
Mauritius I.
Reunion I.
Ascension I.
St. Helena I.
Azores Is.
Canary Is.
Madeira Is.
Cape Verde Islands
Sokotra I.
Pemba I.
Mafia I.
Comoro Islands
Lands End
North Cape
C. Finisterre
C. Spartel
C. Bon
C. Blanco
C. Bojador
C. Guardafui
C. Delgado
C. Corrientes
C. Ste. Marie
C. Amber
Tropic of Cancer
Tropic of Capricorn
Equator
Mt. Fuji
Mt. Everest
Delta of the Ganges
Singapore
Ceylon
Samoa Is.
L. Eyre
New Zealand
Mouths of the Mississippi R.
C. Hatteras
Mouths of the Amazon R.
Delta of the Orinoco
C. St. Roque
L. Titicaca
Mt. Aconcagua
Iguassu Falls
© Ginn and Company

in better ways of living and in modern methods of work. They will become more and more important to the country as greater development is undertaken.

In the grasslands south of the Sahara the native people have passed beyond the hunting stage in their development and raise cattle or cultivate the soil. Those who have farms establish fixed homes, while those who own cattle wander about. The occupation of a people often affects their ways of living. In this semiarid region members of the same race become wanderers if they take care of cattle, and become settled if they have farms.

Fig. 444. These are the Victoria Falls in the Zambezi River. They are twice as high as Niagara, and the amount of water pouring over them is much greater. Some day these falls will be harnessed, and the electric power from them will run railroads, factories, and mines hundreds of miles away

There still remain in Africa several tribes of native people who are savages. They inhabit the forests and live by hunting and fishing.

The Pygmies, who are true forest-dwellers, live in the Congo jungle. A full-grown man is about four feet high. They are hunters, and because of their small bodies can move about in the dense undergrowth, hunting big game more easily than larger people could. They barter the game for fruit raised by those who dwell in the clearings. The Pygmies are related to the Bushmen of South Africa, who are also great hunters. The Zulus and Kafirs form by far the greater part of the native population in the plateau region of South Africa.

In each of the colonies of European nations there are many people from the home country, and the number of white people of European descent along the Mediterranean coast and in South Africa is constantly increasing. A great many French and Italian people have settled in North Africa, but in South Africa most of the European people are Dutch, British, or Portuguese. On the coast to the north and east of Abyssinia the Italians have established two colonies, and between these colonies there is a small British colony.

Fig. 445. The Sahara Desert covers two million square miles in northern Africa. Over large areas it is a sea of sand, piled by the wind into dunes which look like waves. The sandy waste is broken in some places by green oases and in others by bare, rocky hills and mountains. The desert is crossed only by the camel-train routes

Home work. Read about the Pygmies, Bushmen, Hottentots, and Zulus and report to the class.

MAP STUDIES

1. Where does Africa come nearest to Asia? 2. What is the name of the canal which has been cut through that isthmus? 3. Describe the Nile, Niger, Congo, and Zambezi rivers with respect to their navigability. What unusual features do you find?

4. From what highlands do many of the headwaters of the Nile come? 5. Explain the lack of tributaries in the lower course of the Nile. 6. What mountains are at the northwest margin of the continent?

7. What is the general elevation of the plateaus of South Africa? How do they compare in elevation with the Sahara Tableland? 8. Locate one great delta in Africa. 9. What large city is on this delta?

10. How does the amount of lowland in Africa compare with that of other continents? 11. Name the chief natural regions. 12. Where are the highest mountains? 13. Where are the great lakes in Africa?

Problems and review questions. 1. What nations helped in the early exploration of Africa? 2. What nations now have possessions in Africa? 3. Of what value are these colonies to European nations? 4. Why was it difficult to explore the interior of this continent? 5. Who were the chief explorers of the interior? 6. In what part of Africa do most of the native tribes of negroes live? 7. Where do most of the white people live?

Home work. 1. Look up the lengths of the Suez and Panama canals. When was each one opened? 2. Read about Stanley's travels in Africa. 3. Read about Livingstone's travels in Africa. 4. Find out what you can about the Cape-to-Cairo Railway.

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Fig. 446. This is Kouinine, an old Saharan town of Algeria. The picture is taken from an aëroplane. Beyond the town you can see the groups of palm trees which have grown up in the hollows between the sand dunes. Far in the distance stretches the sandy waste of the Sahara

Natural Regions

Coastal lowlands. Africa has very little lowland. The lowland areas are near the coast, and most of them are hot and unhealthful. *See map on page 218.*

The Sahara Tableland is nearly as large as Europe, and it is the largest continuous desert in the world. It varies from 600 to 3000 feet above the sea. It is much lower in the west than in the east, and the Tibesti Mountains in the central part of the tableland rise 8000 feet above sea level. Much of it is a vast, stony waste, but in portions sand is abundant (Figs. 445, 446). *See map opposite page 230.* In the east the Nile crosses the desert, and bordering the river there is a long, fertile oasis. Where there are springs or wells that furnish waters for irrigating the land there are other oases in the desert.

Besides those people who live on the oases in the desert there are many who travel from one oasis to another as traders. They are chiefly Arabs, and they have several well-established caravan routes (Figs. 447, 449).

The Atlas Mountains are much like the mountains of southern Europe. They are young and rugged. Some of their peaks rise to a height of over 14,000 feet. They are folded mountains with parallel ranges, between which there are rich valley lands where most of the people in this part of the country make their homes.

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Fig. 448. This is the volcanic peak of Mt. Kilimanjaro. Locate this peak on your map. What is its elevation? Are the mountains in this region young and rugged or old and worn-down?

The plateaus of South Africa have a general elevation of from 3000 to 4000 feet. There are parts where the elevation is as high as 5000 feet, and small mountain ranges in the plateau region rise still higher. On the western margin, and well shown on the map opposite page 230, there is a bold escarpment, or cliff, bordering the coast. To Europeans who intend to become permanent settlers in Africa these plateaus are more attractive than almost any other part of the continent.

Fig. 447. These Arab traders have pitched their tents on the edge of one of the oases in the Sahara Desert. They will stay here long enough to do their trading with the inhabitants of the oasis, and then they will move on to the next one. What do you think they buy and sell?

The Abyssinian Highlands and the Southern Highlands. The Abyssinian Highlands include a mountainous and heavily forested region. Most of the summits are from 5000 to 14,000 feet high. A little farther south there is a group of lofty volcanic peaks. Kilimanjaro (Fig. 448) and Kenya are in this group. To the north of Lake Edward is Mt. Ruwenzori, one of the highest peaks in Africa.

The Southern Highlands are composed of several small ranges with plateaulike areas between the ranges. The Drakensberg is the most conspicuous range.

Climate

Most of Africa is too hot for white people. It does not extend far enough north or south of the equator to have much land in the temperate zones. The only relief from the continuous heat is found in the mountains or in the higher plateaus.

When the sun appears to move northward during the northern summer, the equatorial rainy belt follows

Fig. 449. This caravan of camels is starting on its journey across the desert. The Arabs are very fond of their faithful camels and treat them kindly. In the distance are the mountains of Algeria, which border the desert. Where do you think this caravan is going, and why?

the apparent movement of the sun, and the lands between the equator and the Sahara have a rainy season.

The prevailing winds in the Sahara are the northeast trades. As they come chiefly from land areas, they have very little moisture, and as they blow toward the equator they become warmer and tend to take up more moisture. This is why there is such a great desert in northern Africa.

When the vertical rays of the sun strike farther south and the sun appears to go south, the rainy belt moves in that direction also, and the great Congo basin, which gets more or less heavy rain throughout the year, is abundantly watered. Near the equator rain falls nearly every day. Even the lands a little farther south receive heavy rains. Still farther south, winds bring an abundance of rain to the southeast coast, but leave the southern interior and southwest coast dry. *See map on page 230.*

Vegetation and Animal Life

There is a great likeness between the plants found in northern Africa and those found in southern Europe. The continents were formerly connected, and seeds were blown from one land to the other. Oaks, olive trees, vines, figs, and many of our common cereals are found growing here. Farther south, beyond the great desert barrier, are the savanna lands and the tropical forest, where the plant and animal life is very different from that in the north. *See map opposite page 230.* Among the animals found on the savannas are ostriches, elephants, zebras, buffaloes, giraffes, antelopes, and rhinoceroses. In the jungles there are fierce beasts of prey, such as the lion, panther, and hyena.

The dense tropical forest in the Congo basin has two layers. From the thick undergrowth on the ground, constituting the lower layer, the tall trees reach up for light and air. They have few branches except near the top, and there the branches are intertwined with growing vines and other clinging plants, until a canopy is made so dense that even when the sun is bright the interior of the forest is dark. Many of the most brilliantly colored birds and butterflies live in this upper story where the sun shines, but in the lower story are the huge beasts that wander about and prowl into the Sudan to prey upon the grass-eating animals.

The Sudan district, extending east and west just north of the tropical forest, is a savanna type of country. Cattle-raising and some farming are being undertaken here. South of the tropical forest is another savanna, and still farther south is another desert. *See map opposite page 230.*

Natural Resources

Use map on page 227. So vast a land as Africa must of course have much in it which is of value to man. Those portions that can be cultivated have been found to contain rich soils. In the mountains gold, silver, lead, tin, and copper have been discovered, and there is coal and oil in several localities. Some of the water-power is being used, but there are many other sites where water-power may be developed. In the south (in the plateau district) and along the west coast the most brilliant diamonds in the world are obtained (Fig. 450).

The tropical forest of central Africa, like that of South America, yields rubber. There are mahogany and many other valuable trees in the forest, but the woods are not as yet in common use, because it is difficult to get them to market. The elephants of the jungle are being killed rapidly by the native people for their ivory tusks which form a valuable export product (Fig. 451).

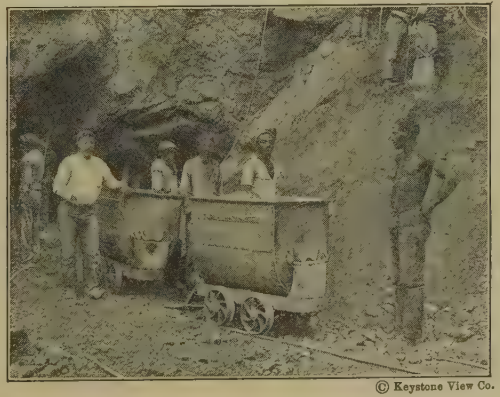

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Fig. 450. Down in the Kimberley diamond mines the natives load the diamond-bearing earth into little cars. The cars are then hoisted to the surface, where the gems are separated from the dirt

© Keystone View Co.

Fig. 451. These ivory tusks are ready for export from Mombasa. The elephants are hunted in the African jungle, and their tusks brought out by native porters. Each tusk weighs about 50 pounds

Courtesy of Eugene J. Hall

Fig. 452. Here are three water carriers of Cairo. Over their backs are slung the heavy goatskins filled with water which they peddle about the streets of the city

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Fig. 453. Cairo is the chief center of Mohammedan teaching. At the end of this old arched street you can see the Mohammedan University, which was founded in the year 988

Courtesy of Eugene J. Hall

Fig. 454. These people are climbing the Great Pyramid near Cairo. This pyramid was built more than 3000 years before Christ as a tomb for a great Egyptian ruler

Copal, which is shipped from Banana, is a resin that comes from certain of the trees of the forest and is used in making varnishes.

Problems and review questions. 1. Why is Africa so warm? 2. Where are the coolest places? 3. Explain the little rainfall in the Sahara. 4. What conditions produce dense tropical forests? 5. In which other continent is there a large tropical forest? 6. Describe a tropical forest.

7. What use is made of the grasslands of Africa? 8. Why may the Sahara be thought of as a barrier to both plants and animals? 9. What are the chief natural resources of the mountain and plateau portions? 10. What useful products are obtained from the forests?

Home work. 1. Find out how the native people collect and prepare the crude rubber. Report to the class. 2. Read about the way the people live who work in the diamond mines near Kimberley.

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Fig. 455. This is the great Nile Bridge at Cairo. It is a modern steel structure nearly a quarter of a mile long. Automobiles, carriages, trolley cars, and bicycles are in common use in Cairo to-day, but many of the natives still ride on camels, just as their ancestors did years ago

EGYPT

During the World War Egypt, which was formerly controlled by the Turks, became a British protectorate. In 1922 the protectorate was withdrawn and Egypt became a free state with a native king.

Egypt is of special interest because of its early civilization and the frequent references to the land of the Nile in Biblical writings. The early people who lived in the lower valley of the Nile had the advantage of rich soils and a warm climate. They were shut off from hostile tribes by desert barriers and the sea. In those days invading tribes did not travel by water. Agriculture, education, and science were promoted by the early Egyptians, and they built the wonderful pyramids (Fig. 454). Persian tribes later pushed westward and conquered Egypt, and the Arabians, Greeks, and Romans each took a turn at invading this rich land of the Nile.

To-day there are over 12,000,000 people living here. Almost all the nations of Europe, and especially those of southern Europe, are represented. At the head of the great delta of the Nile stands **Cairo**, the capital of Egypt and the largest city in Africa (Figs. 452, 453, 455). **Alexandria**, the second largest city in Africa, is a commercial center with many modern conveniences.

The great cotton plantations that have made the Nile country famous are on the delta and flood plain of the river. Egyptian cotton has a very long fiber and is used in the manufacture of our best cotton goods.

Each year the Nile overflows its banks and waters the broad, flat lands bordering the stream (Fig. 456).

The flooding of the Nile is due to the very heavy rains that fall during the northern summer at its sources. The flood comes usually in July, providing water for the agricultural lands along the stream, but in years when there is less rainfall than usual extensive irrigation must be practiced. The British government has built a great dam at Aswan to conserve the waters of the Nile for irrigation purposes.

Home work. 1. Look up the subject of irrigation in Egypt. 2. Find out all you can about the pyramids of Egypt.

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Fig. 456. This is a view on the delta of the Nile near Cairo. In the distance are the pyramids. The ancient Egyptians worshiped the goddess of the Nile as the giver of all good things. Can you explain why the Nile was so important to them that it became the center of their religion?

BRITISH POSSESSIONS

The British have control of about one third of the continent of Africa. The Anglo-Egyptian Sudan has been under British control since 1899. South of the Sudan is British East Africa, which borders the Indian Ocean. Still farther south are Nyasaland, Rhodesia, Bechuanaland, the Union of South Africa, Swaziland, and Basutoland. The British also have lands on the west coast of Africa. These are Nigeria, the Gold Coast, Sierra Leone, and Gambia. In addition, the British control part of Somaliland and several islands off the African coast.

Home work. On an outline map of Africa, shade or color the British possessions. Add their names. *Use map on page 227.*

Anglo-Egyptian Sudan. In this district cotton is raised. Ostrich feathers, dates, and rubber are brought into the chief city, **Khartum**, for shipment. This is one of the cities of Africa from which the great supplies of gum arabic and ivory are exported.

Somaliland. This little protectorate on the Gulf of Aden is a pasture land. It is a lowland, and there is little rainfall, so the people are obliged to move about in order to take proper care of their stock.

British East Africa. This area includes **Kenya Colony, Uganda, Tanganyika Territory** (formerly German East Africa), and the protectorate of **Zanzibar.** The narrow coastal lowland is a hot, wet, unhealthful place. Only natives can work here. They raise rice, sugar, sweet potatoes, and other crops. The dense forests near the coast produce rubber. Farther inland, on the plateau, the climate is more agreeable, and grains, cotton, coffee, and a large variety of crops are raised by native laborers under European supervision. The railroads from Mombasa to Port Florence, on Lake Victoria, and from Dar es Salam to Ujiji, on Lake Tanganyika, have helped to develop this region.

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Fig. 457. This drawing shows the troughlike valley of the Nile and the great fan-shaped delta at its mouth. This valley is the most densely populated part of Africa. Why do so many people live here? Contrast their life with that of the desert people to the east and west

Southern possessions. The British possessions in South Africa lie for the most part in the high plateaus or in the Southern Highlands. *See map on page 218.*

In the north, in what is known as **Rhodesia**, the plateau is an extensive grassland which is used for the grazing of cattle, sheep, and goats. Farther south, in the interior, is the protectorate of **Bechuanaland**, much of which is included in the semi-desert of Kalahari, where the rainfall is so light that little vegetation can grow. Here the population is very sparse.

The rains that do come to this region come in the summer months of November, December, and January. Then the grasses and flowers spring

Fig. 458. Cape Town is the chief port of the Union of South Africa. In the background the rugged cliffs of Table Mountain rise more than 3000 feet above the city. When the white clouds drift over its summit, the people say it has its tablecloth on. The harbor is off to the left

up so suddenly that the whole landscape is changed as if by magic. After the rainy season is passed, the grasses dry and the landscape appears gray. The dried grass becomes a standing hay, and much of it about the margin of the desert is eaten by cattle, sheep, or goats.

In the southern part of the plateau, at elevations of 4000 feet or over, the summer temperature is seldom over 90° F. in the shade, while the nights are always cool throughout the year. During the winter months of May, June, and July the nights are frosty and the days are warm and clear.

Here four provinces, the **Transvaal, Natal, Orange Free State,** and **Cape of Good Hope,** have been joined together, and they now form the **Union of South Africa.** The government of this Union is similar to that of Canada, and the people have about as much freedom and independence as in a republic.

This portion of South Africa is well suited to white people, and it is the part where great mineral wealth has been discovered. Here the settlers are progressive. Railways, trolley lines, automobiles, telephones, telegraphs, electrical appliances, and all modern conveniences have been introduced. We may expect a more rapid development in this part of Africa than in any other portion of the continent.

Fig. 460. Inside the Kafir house you can see the stout poles which support the roof, and the round fireplace with its three-legged kettle for cooking the family meals. At the back are the sleeping mats, the dishes, and the pumpkins which the Kafirs raise and eat in great numbers

The Southern Highlands and the southeast coastal belts receive an abundance of rain, for the southeast trade winds that blow over the Indian Ocean reach this region and are forced to give up moisture.

Along the coast sugar cane, bananas, pineapples, and rice are raised. On the higher lands tea and coffee are grown, and in places among the mountains and on

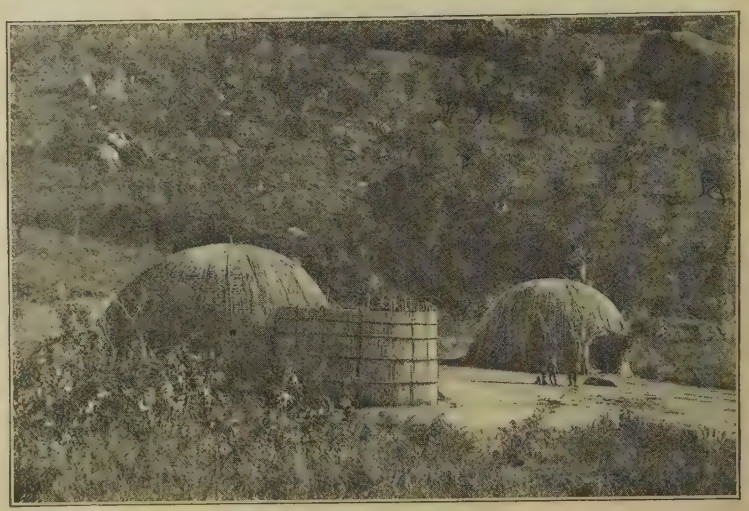

Fig. 459. The native Kafirs of South Africa live in beehive-shaped houses. They are low and are built of thin poles interwoven with grass. This view shows two of these houses. The one without a roof is not a house but a corral for the cattle which belong to the family

the neighboring plateau where irrigation is practiced general farming and dairying are carried on.

The pastures of the Southern Highlands are used for raising cattle, sheep, goats, and ostriches.

Johannesburg, which is in the Transvaal, is a modern city located on the plateau in the midst of the richest gold-producing area of the world (Figs. 461, 462). **Kimberley,** a little farther south, is famous for the wonderfully clear and beautiful diamonds that are found near there. Copper, tin, and coal are also found near these mining centers. **Cape Town** (Fig. 458), the chief port of South Africa, is the southern terminus of the railway which will run through to Cairo when completed. **Pretoria** is the capital of the Union of South Africa. **Port Elizabeth** is an important port (Fig. 463).

The Union of South Africa governs **Southwest Africa,** a former German colony.

The **Cape-to-Cairo Railroad** will be nearly 7000 miles long when it is completed. More than half of this great railroad has already been built, and most of it will lie entirely within territory under British control.

West Coast possessions. These possessions include **Nigeria** and the **Gold Coast** on the Gulf of Guinea, and **Sierra Leone** and **Gambia** farther west. Each one of them

Fig. 461. Johannesburg is in the gold district of South Africa. Thirty years ago it was little more than a huddle of tumbledown miners' huts. To-day it is a prosperous city with broad streets and beautiful buildings. Locate Johannesburg on your map. What is the cause of its rapid growth?

is of real value to the British people. The ports are open to vessels from all nations, but very naturally the trade with England is greater than that with any other country.

These lands are inhabited chiefly by negroes. The number of white people is very small, but they hold the important positions and have general control over the colonies. There are excellent forests here. Palm oil and fiber, rubber, ivory, and some coffee are exported. Gold Coast was so named because of the gold that was found there.

Problems and review questions.

1. Where are the chief British possessions in Africa? 2. Of what value are such lands to the British people? 3. Where do most of the white people live in these possessions? 4. Where is the best cotton raised in Africa? 5. Explain the floods of the Nile in July.

6. Through what countries does the Cape-to-Cairo Railroad pass? 7. How would railroads help in the development of the African countries? 8. What mineral and what gem is South Africa especially noted for?

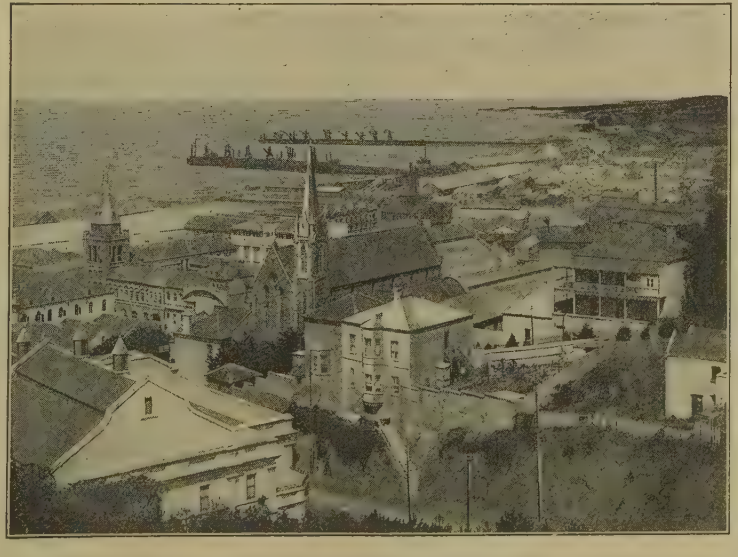

Fig. 463. Port Elizabeth is a railroad terminus and an important port of the Union of South Africa. It has no real harbor, and this view shows the long wharves which run out into the open water, with the derricks for loading and unloading vessels. Can you explain the importance of Port Elizabeth?

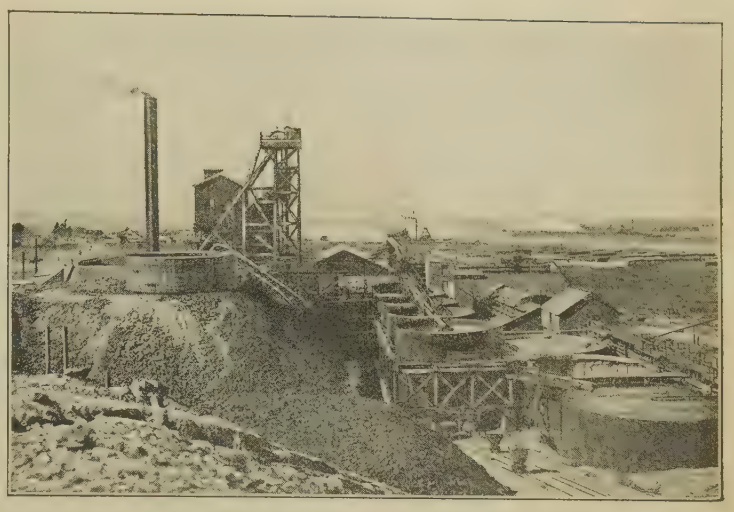

Fig. 462. This is one of the plants for the refining of gold at Johannesburg. The ore, which is mined from the underground layers, or "reefs," is brought to the surface, sorted, crushed, and finally reduced to pure gold. Where is the gold sent from Johannesburg? What are its uses?

FRENCH POSSESSIONS

The French control about as much territory in Africa as the British, if we include the island of Madagascar, but a large portion of the French possessions is in the Sahara.

Morocco. The French protectorate over Morocco was established in 1912. The Sultan, who formerly had supreme power, must now follow the advice of a French Resident General in all matters. The climate of most of Morocco is delightful, and certainly the best in northern Africa. Cool breezes come in from the Atlantic, and the snow-capped summits of the Atlas Mountains keep off the hot winds of the Sahara (Fig. 464).

The interior portions of this country are as yet unfit for foreign travelers. Neither life nor property is safe here. Where the French have full control there has been a marked improvement, especially in means of travel. Good roads have been made, so that motor cars can go quickly far into the interior. There are also a few modern conveniences, such as the telephone and the telegraph.

Many parts of the country have rich soil suitable for agriculture, but as yet the methods in use are primitive. Vine-growing is promising; cotton has been introduced; fish are abundant along the coast; and in the mountains

many metals, such as copper, iron, lead, gold, and silver, have been found. The Moors, who live in Morocco, are a remnant of the race that once conquered Spain.

Algeria is divided into three somewhat distinct parts. In the north is the narrow coastal belt, where the soils are fertile and where European farmers are engaged in raising the vine, cereals, olives, and oranges.

In the interior the land is high and mountainous; it is used chiefly by the native people for raising cereals and for pasturing cattle during the summer.

Farther south is the desert region. Here there are oases, where the date palms and other trees bear fruit in summer and where the native people pasture their herds of cattle during the winter. Great fortunes are made in the dates from these oases (Fig. 467).

Fig. 464. Tangier, the chief seaport of Morocco, is located on a sheltered semicircular bay at the Atlantic end of the Strait of Gibraltar. It is a very old city, and at different times has belonged to Portugal, Spain, and England. To-day it is the principal outlet for the products of Morocco

The extreme desert conditions in the south of Algeria limit European colonization more effectively than any other barrier.

The climate and vegetation of Algeria are like those of southern Europe, but they are a little more nearly tropical. The rainfall on the northern slopes of the Atlas Mountains is about 25 inches a year, and on the southern slopes it is about 20 inches. On the border of the desert the annual rainfall varies from 7 to 15 inches.

Algeria suffers on account of the lack of any large rivers and from a long, dry summer season. Extensive irrigation works have been undertaken, and many deep wells have been drilled. At the southern base of the Atlas Mountains there are large supplies of water, which can be obtained by drilling deep holes into the rocks.

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Fig. 465. Algiers is the capital of Algeria, the most important French possession in Africa. The city is located on the west side of the Bay of Algiers. The harbor works have cost the French a great deal of money. This view shows the large number of wharves which have been built in order that many ships may load and unload at the same time

MAP STUDIES

1. Make a list of the chief seaports of Africa. Opposite the name of each port place the name of the country in which it is located. 2. Why are there so few large cities in the interior of Africa? 3. What is there on this map that helps you to determine the climate of northern Africa?

4. What part of Africa is best supplied with railroads? What explanation can you offer for this fact? 5. Describe in detail the route of the Cape-to-Cairo Railroad.

6. Make a table with three columns: in one write a list of the chief foods exported from Africa; in another, the chief raw materials used in manufacture; and in the third, the chief mineral exports. For the exports from northern Africa see the map between pages 207 and 210.

7. What animal products are shipped from Africa? What vegetable products? 8. Name ten products that are shipped to the United States. 9. Are the chief imports into Africa foods or manufactured articles? Why? 10. To what island near Africa should you send for cloves?

11. To what part of Africa should you go if you wished to visit a diamond mine? a gold mine? a coffee plantation? a rubber plantation? a cotton plantation? a date grove? 12. Name four large navigable rivers in this continent. 13. In which of these rivers is navigation interrupted by falls, rapids, or cataracts?

14. What large city in the United States is in about the same latitude as Cairo? *See western margin of map.* 15. Through what countries does the equator pass?

16. What countries in Africa are wholly or in part in west longitude? 17. Judging from this map, what parts of this continent should you think are densely settled? What parts are sparsely settled? Why? 18. Make a list of the European nations that have African possessions. Opposite the name of each one of these nations place the names of their African possessions.

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Tunis is the name of a country and of a city. The city is connected by a canal with the sea. The people in this colony are chiefly Arabs, but there are many settlers who have come across the Mediterranean from the countries of southern Europe. The Europeans are the agriculturists, and they raise wheat, barley, oats, and fruits. Many of the grapes are used for making wine. The native people do some weaving. They make carpets and are skillful in embroidering leather goods. There are cork factories in Tunis, and the cork forests might well be further developed.

Fig. 466. This is a native Arab family of the Algerian Sahara. They are traveling, and all their possessions are loaded on the backs of the two little burros. Can you describe their life?

Home work. 1. On your outline map of Africa, shade or color the French possessions. 2. Find out what different tropical products are obtained from the various kinds of palm trees.

French West Africa and the Sahara. Most of French West Africa is a part of the Sahara. On the southern margin of the desert there are grasslands where cattle are being raised. In parts of French West Africa there are modern improvements, such as good roads, railways, telephones, and telegraphs, and a telegraph line is nearly completed across the great desert from Timbuktu to Algeria. The **Ivory Coast** and **Dahomey** are important portions of French West Africa. Rubber and palm oil are the chief products.

French Equatorial Africa. The name "French Congo" was formerly given to this country. It is so near the equator that the climate is exceedingly hot and damp. It is estimated that there are 9,000,000 negroes in this colony, and many of the tribes are only half civilized. The southern portion is densely forested, and to the north, on the margin of the forest, is a grassland, or savanna.

Fig. 467. The people who live in the green oases along the northern edge of the Sahara Desert raise the finest dates in the world. In this view they are packing the dates in boxes for shipment. Can you explain the presence of these oasis gardens in the midst of the dry, sandy desert?

Somaliland. On the east coast of Africa, bordering the Strait of Bab-el-Mandeb, is French Somaliland. Some coffee is raised here, and from its only port, Jibuti, ivory and hides are exported. These products are brought to Jibuti by rail from Abyssinia.

Madagascar. In 1896 the entire island of Madagascar was placed under French control. The population consists of natives of France, a few other European people, some Chinese and Malay people, and many native Africans. Agriculture is the chief occupation in Madagascar. Much rice is grown in the moist lowlands, and cattle are raised in great numbers on the uplands.

Problems and review questions. 1. Name the French possessions in Africa. 2. How do the French improve conditions in their colonies? 3. Why are large portions of the French colonies unattractive to white people? 4. What products are shipped from the French colonies? 5. What colony has a good supply of cork that should be developed?

OTHER EUROPEAN POSSESSIONS

Former German Possessions. **Togo, Kamerun (now called Cameroons), Southwest Africa, and Tanganyika Territory.** These colonies are inhabited by millions of native negroes and a few white people.

Those parts that are near the equator produce cocoanuts, coffee, rubber, ivory, and palm oil. In the grassland belts north and south of the great tropical forests, sheep, cattle, and goats are raised. Many beautiful diamonds have been obtained from the sands of the west coast, and the miners believe they have located the old volcano where these diamonds were formed.

These colonies have been but little developed. There are only a few miles of railway, and the telegraph and telephone are just beginning to be used.

The French and the British have divided the administration of Togo and Cameroons, and Southwest Africa and Tanganyika Territory are under British control.

Portuguese Possessions. **Angola.** Because of its location on the plateau, from 3000 to 4000 feet above sea level, Angola has a pleasant climate. It is the largest of the Portuguese colonial possessions, and contains rich plantations of rubber trees, coco palms, and coffee. The trade is largely with Portugal, and in exchange for their native products the inhabitants import textiles. There are several hundred miles of railroads here, and telegraphs and telephones are also in use.

Mozambique (**Portuguese East Africa**). About half of Mozambique is a low coastal plain, and the southeast trades coming to this region bring an abundance of moisture. Sugar and coconuts are raised, and in the mountains gold and coal are mined. The trade is chiefly with Europe and India.

The Portuguese also hold **Portuguese Guinea,** the **Madeira** and **Cape Verde Islands,** and several other small islands near Africa.

Review questions. 1. Name the Portuguese colonies. 2. What one is most suitable for white people? 3. What products do the Angola colonists send to Portugal? 4. What are the chief imports of Angola?

Italian Possessions. **Libia.** Much of the interior of this land is a desert, and so the population is confined chiefly to the coastal region. Olives, lemons, and fruits are raised, and esparto grass is grown. Esparto grass is used to make ropes, baskets, shoes, paper, and cloth. Caravan routes from the Sudan lead to **Tripoli.** Large quantities of ostrich feathers from the Sudan, and dates from the desert oases, are brought to Tripoli for shipment.

Eritrea and **Somaliland** are both populated chiefly by negroes, who make their living by agriculture or the care of stock.

Review questions. 1. Where are the Italian colonies in Africa? 2. What products are shipped from these colonies? 3. What is the chief Italian seaport in northern Africa? 4. What products reach Tripoli from the Sudan?

Belgian Possession. **Belgian Congo.** This is the land of the jungles and dense tropical forests described on page 221. There are at least 7,000,000 natives and about 5000 Europeans in this colony.

Ships can go 100 miles from the coast up the Congo River. At this point is the little village of **Matadi.** For the next 200 miles there are rapids, and a railroad has been built along the side of the river. At the upstream end of the belt of rapids is **Leopoldville,** and from there for 1600 miles the Congo River is navigable. This brings the traveler to Stanley Falls, named in honor of the great English explorer. Study the map on page 227 for the products of Belgian Congo.

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Fig. 468. This engine is used on the railroad which crosses the equator near Stanley Falls in Belgian Congo. What kind of fuel is burned in this engine? Why has the railroad been built in this particular place? ***See map on page 227***

Spanish Possessions. Just south of the Strait of Gibraltar is a small area which was once a part of Morocco, but which has been left by treaty to the control of the Spanish people. A little farther south, on the west coast, is **Rio de Oro.** This is a land with some rich soils. It consists chiefly of a coastal plain, but the rainfall is not sufficient to make it a good agricultural country. The **Canary Islands** belong to Spain, and the governor of the islands has charge of the colony on the mainland. East of the Gulf of Guinea there is a small country known as **Rio Muni.** This and a number of little islands in the Gulf of Guinea are under Spanish rule.

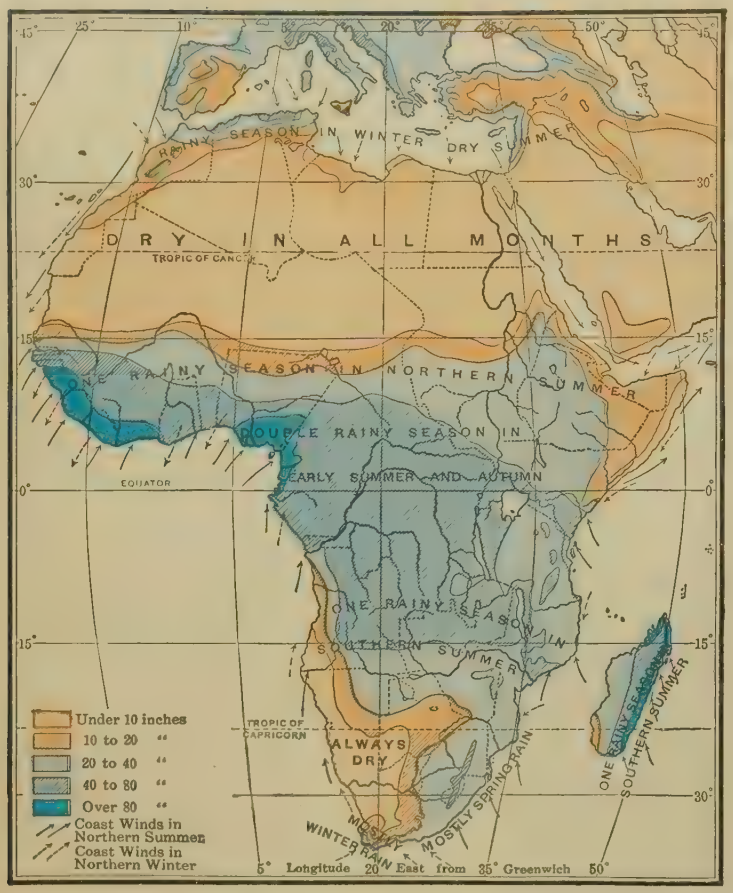
Review questions. 1. Where is the Belgian colony in Africa? 2. What people live there? 3. What are the products of the tropical forest? 4. How far may boats go up the Congo? 5. Where are the chief Spanish possessions in or near Africa?

LIBERIA AND ABYSSINIA

Liberia. The Republic of Liberia was established in 1847 by people in the United States as a land for freed American slaves. The constitution and form of government are modeled after those of the United States of America, and the flag of Liberia is quite similar to ours. The flag has red and white stripes, and in the blue field where we now have forty-eight stars Liberia has one large star. The people of Liberia all belong to the black race. Part of the country is populated by the free, or American, Liberians and the remainder by the original native tribes.

The natural resources of this little republic are almost wholly undeveloped. Coffee, cacao, and cotton are produced in small quantities. Gold, iron, tin, and copper have been mined a little. There are no railroads in Liberia, and with the exception of ox-carts there is no means of transportation. **Monrovia** is the capital and chief seaport.

Abyssinia is another independent country in Africa. It is organized as an empire. Most of the people are farmers or are engaged in raising cattle, sheep, or goats. The chief exports are hides, coffee, and ivory. Cotton goods form the chief import. Jibuti, in French Somaliland, serves as the port for Abyssinia.


DRY IN ALL MONTHS
RAINY SEASON IN WINTER
DRY SUMMER
ONE RAINY SEASON IN NORTHERN SUMMER
DOUBLE RAINY SEASON IN EARLY SUMMER AND AUTUMN
ONE RAINY SEASON IN SOUTHERN SUMMER
ALWAYS DRY
MOSTLY SPRING RAIN
WINTER RAIN
ONE RAINY SEASON IN SOUTHERN SUMMER
TROPIC OF CANCER
EQUATOR
TROPIC OF CAPRICORN
Under 10 inches
10 to 20 "
20 to 40 "
40 to 80 "
Over 80 "
Coast Winds in Northern Summer
Coast Winds in Northern Winter
Longitude 20° East from 35° Greenwich
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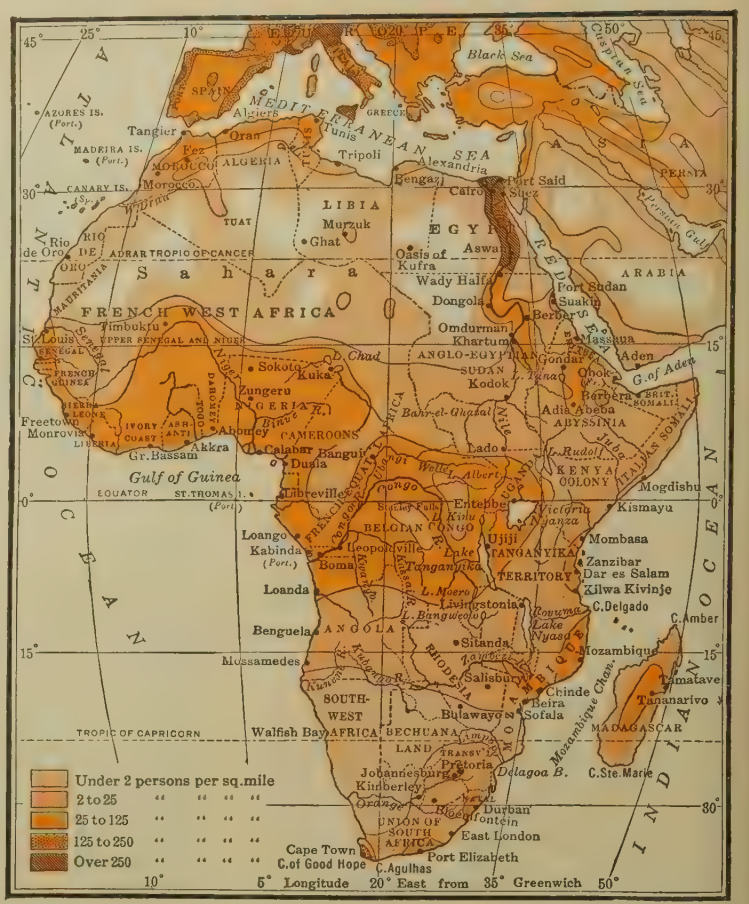
Average annual rainfall in Africa



Distribution of people in Africa

COMPARATIVE MAP STUDIES

1. From a study of the three maps before you, describe the country through which the equator passes in Africa. 2. Describe the geographic features of the Sahara. Are there any mountains in this desert? Are there any permanent streams? If so, how can that be explained? What is meant by "wet-weather" streams? How can there be wet-weather streams in a desert?

3. Where do people live in this desert? 4. What is meant by an oasis? 5. How can an oasis be explained? 6. Can you locate any oases on the population map? 7. How are routes of travel laid out across the desert?

8. How do the Atlas Mountains influence the amount of rain that falls on the northwestern coast of Africa? 9. How much is the rainfall there? 10. How does the amount of rain on the north coast of Africa affect the distribution of population in that part of the continent?

11. Notice that there is very little continental shelf about Africa. This means that the great continent of Africa is almost all above water. North America and Europe are in part under the water and have wide continental shelves.

12. The number of square miles in each of the continents is shown in the Appendix. Which continent is larger than Africa? Which continents are smaller than Africa? *See map on page 275.*

13. Name four large rivers in Africa and, from a study of these maps, describe the country through which each flows.

14. What is the most striking difference between the coast line of Africa and that of Europe? What disadvantages are there in a coast line like that of Africa? 15. How do the mountains of Madagascar affect the distribution of rainfall on that island? 16. What winds bring the rain to Madagascar? 17. What is the annual rainfall in the region where the great African lakes are located?

18. Explain the location of the tropical forests. 19. What is the annual rainfall in these forests? 20. What products should you expect to find in the great tropical forests? 21. What are the best routes of travel in those forests?

22. What is the annual rainfall in the grasslands north and south of the tropical forests? 23. From these maps what should you think the chief occupations of people in these belts must be? 24. Why has the coastal region north of the Gulf of Guinea a tropical forest?

25. Explain the presence of forests in the Abyssinian Highlands. 26. What great valley in South America has a tropical forest like that in the Congo Basin? 27. Why is there so little rainfall in southwestern Africa and on the west coast of South Africa?

28. In what parts of Africa do most of the people live? 29. How in general is the distribution of population in Africa related to the distribution of rainfall? 30. How can you explain the dense population in the valley of the Nile? 31. What winds come to the southeastern coasts? 32. What portions of Africa will prove most attractive to permanent white settlers? Why?

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ASIA
PHYSICAL MAP
SHOWING NATURAL REGIONS
Scale of statute miles
0 100 300 500 750 1000 1500
Scale of kilometers
0 200 500 1000 1500 2000
Land below sea level
Lowlands
Young, rugged mountains
Uplands and plateaus
Old, worn-down mountains
Average summit elevations in natural regions indicated thus: 500 to 1000 ft.
Comparative Area
REDFIELD-KENDRICK-ODELL CO., N.Y.
ATLANTIC OCEAN
EUROPE
AFRICA
ASIA
ARCTIC OCEAN
PACIFIC OCEAN
INDIAN OCEAN
EAST INDIES
Mediterranean Sea
Black Sea
Caspian Sea
Red Sea
Arabian Sea
Bay of Bengal
South China Sea
Yellow Sea
East China Sea
Sea of Japan
Sea of Okhotsk
Celebes Sea
Sulu Sea
Banda Sea
Java Sea
Gulf of Aden
Gulf of Oman
Persian Gulf
Gulf of Siam
Gulf of Tonkin
Gulf of Mannar
Palk Strait
Malacca Str.
Str. of Makassar
Str. of Gibraltar
Suez Canal
Panama Canal
Bering Str.
Behring Str.
Kara Sea
Laptev Sea
East Siberian Sea
Beaufort Sea
Hudson Bay
Baffin Bay
Davis Str.
Greenland Sea
Barents Sea
White Sea
North Sea
Baltic Sea
Irish Sea
English Channel
Bay of Biscay
Adriatic Sea
Aegean Sea
Sea of Marmora
Dead Sea
Caspian Depression
Lake Baikal
Lake Balkash
Aral Sea
Lake Tsaidam Basin
Lake Kuku Nor
Tuz Gölü
Lake Van
Lake Urmia
Lake Titicaca
Great Salt Lake
Tundra
Taimyr Peninsula
Novaya Zemlya
Spitzbergen
Franz Josef Land
New Siberian Islands
Wrangell I.
St. Lawrence
Kamchatka Peninsula
Sakhalin
Kuril Islands
Hokkaido I.
Honshu I.
Shikoku I.
Kyushu I.
Ogasawara Is.
Volcano Is.
Riukiu Is.
Taiwan (Formosa)
Philippine Islands
Luzon
Mindanao I.
Palawan I.
Caroline Islands
Pelew Is.
Batan Is.
Natuna Is.
Banka I.
Sumbawa
Flores I.
Timor I.
Java
Sumatra
Borneo
New Guinea
Celebes
Malay Peninsula
Ceylon
Laccadive Islands
Maldive Islands
Andaman Islands
Nicobar Islands
Socotra I.
Shoriya Mokya Is.
Hainan
Aleutian Is.
Kurile Islands
Ural Mts.
Caucasus Mts.
Taurus Mts.
Elburz Mts.
Hindu Kush Mts.
Karakoram Mts.
Kuenlun Mts.
Altyn Mts.
Tien Shan
Sayan Mts.
Yablonoi Mts.
Stanovoi Mountains
Kolyma Mts.
Kirghiz Steppe
Plateau of Iran
Plateau of Arabia
Plateau of Tibet
Plateau of India (The Deccan)
Plateau of Mongolia
Plateau of Tibet
Plateau of Tarim
Plateau of Gobi
Lowlands of Turan
Lowlands of India
Lowlands of Siam
East Siberian Lowlands
West Siberian Plains
Manchurian Lowlands
Plain of the Ganges
Plain of Hwang Ho
Plain of Yangtze
East China Highlands
Tungus
Yakut
Buryat
Kirghiz
Turkoman
Kurd
Arab
Bedouin
Tibetan
Chinese
Japanese
Malay
Filipino
Papuan
Eskimo
Aleut
Lapp
Samoyed
Ostyak
Tartar
Mongol
Manchu
Siberian
Hindu
Afghan
Persian
Turk
Armenian
Jew
Negrito
Ainu
Annam
Siam
Burma
Cambodia
Tonkin

MAP STUDIES

1. Compare this map with the one opposite page 256. Describe the relief and vegetation in each natural region. 2. What natural regions of Europe extend into Asia? 3. Name the important groups of islands near Asia.

4. What islands of North America come very near to Asia? To what country do these islands belong? 5. Which of the groups of islands near Asia did Magellan reach? *See Appendix, Plate A.*

6. What European explorer first went far into the interior of this continent? 7. What kind of land did he travel over? 8. Locate on this map the Chinese wall to the north and west of Peking.

9. Should you expect the Aral Sea to be fresh or salt? Why? 10. Of what value are the rivers of Siberia? 11. What natural regions, if any, extend north of the arctic circle?

12. The Pamir is the central knot of mountains in Asia, and it is often called the "roof of the world." What mountains meet at the Pamir? 13. Name and locate the desert plateaus of Asia. *See map opposite page 256.*

14. Is any portion of Asia south of the tropic of Cancer? 15. In about what latitude are the East Indies? 16. Locate a city near the equator. 17. Which are farther from the equator, the Philippine Islands or the Hawaiian Islands? *See eastern margin of map.*

18. How far below sea level is the surface of the Dead Sea? 19. Is any other part of Asia below sea level? 20. Lake Baikal, among the mountains of eastern Siberia, is the largest fresh-water lake in Asia, 400 miles long and from 10 to 60 miles wide.

21. The highest mountain and the highest plateau in the world are located in Asia. Find them on this map and give their names.

Home work. 1. Select three large rivers that flow into the Arctic Ocean, two that flow into the Indian Ocean, and three that flow into the Pacific Ocean. Prepare a list showing their lengths. What rivers in other continents have about the same length? 2. On an outline map of Asia place the great mountain ranges and plateaus, and add their names.

Desert plateaus. Beginning at the west and extending eastward, the desert plateaus are (1) the Arabian, (2) the Iran, (3) the East Turkestan, (4) the Tibetan, and (5) the Mongolian. The Arabian plateau and the Plateau of Iran are in the path of northeast trade winds that blow over a land surface and bring little moisture with them. The other plateaus in this series do not receive rain, because they are surrounded by high mountains that shut off the moisture-bearing winds from the Indian and Pacific oceans. Tibet, the highest plateau in the world, is not only dry but very cold.

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Fig. 470. This is a view of the Bosporus, looking toward the Black Sea from the heights above Skutari in Anatolia. What city is opposite Skutari on the other side of the Bosporus? Why is the Bosporus a very important strait? How many other straits of similar importance can you name?

In western Asia there is a small semidesert plateau in Anatolia. This is surrounded by mountains, but they do not succeed in keeping out all the rain-bearing winds.

The streams from the mountains are used to irrigate the margins of these desert and semidesert plateaus, and in such places people may live.

The Plateau of India is called the Dekkan. Like the Columbia River Plateau in the United States, it has been built up by flows of lava. The Dekkan is bordered on the east by a narrow coastal plain. The plateau receives rain from winds that blow inland from the Indian Ocean, and therefore a large portion of it is under cultivation.

Southern and eastern lowlands. There are four important lowlands in the south and east which command attention: (1) the Mesopotamian lowlands, made of rich soils brought by the Tigris and Euphrates rivers; (2) the plains of India, built up by the Indus, Ganges, and Brahmaputra rivers; (3) the lowlands of Siam and Indo-China, where many rivers have assisted in spreading soils on the lowland area; and (4) the densely settled plains of China and Manchuria. The plains of Mesopotamia and of the Indus are exceedingly dry, and there the living conditions are very difficult. The lowlands farther east are watered by winds that come from over the neighboring oceans. The people living in the well-watered lowlands use very thorough methods in agriculture and raise immense quantities of food.

The islands bordering Asia on the east are portions of great mountain folds in the surface of the earth. In places the crests of these great rock folds broke open, and lava poured forth. Volcanoes thus came into existence, and little by little lofty mountains arose.

The archipelago between Asia and Australia (*see map, p. 258*) consists of the tops of mountain ranges which are parts of the land mass that formerly connected the two continents. If the sea bottom in this region should rise 600 feet, most of the area between Asia and Australia would again be land.

Home work. 1. Prepare a table or list of the high mountain ranges of Asia, giving their elevations and arranging them in the order of elevation. 2. Prepare a similar table for the plateaus. 3. Arrange the plateaus in another list, in their order from east to west.

Climate

Because Asia extends so far from north to south, because it is so very large, and because it has such high mountains, there is great variety in the climate. The tip end of the Malay Peninsula is very near the equator, and at the extreme north the lands are within the arctic circle.

Temperature. The southern part of the continent has warm weather throughout the year. In the interior the changes in temperature from winter to summer are greater than they are in any other place in the world.

In the Siberian Uplands the temperature often falls to 70° F. below zero in winter and rises to 80° above zero in summer. Most of the land north of the Himalaya Mountains has a temperature below 32° F. in January. Only those lands to the south and east, near the coasts, are free from frosts during the coldest months of the year. When summer comes, all but the high regions and the lands far to the north are warm.

The Iran and Arabian plateaus are the hottest portions of Asia, because, in addition to being in the south, their climates are very dry. If there were more moisture, more of the sun's heat would be used up in evaporating the moisture, and the temperature would not be so high.

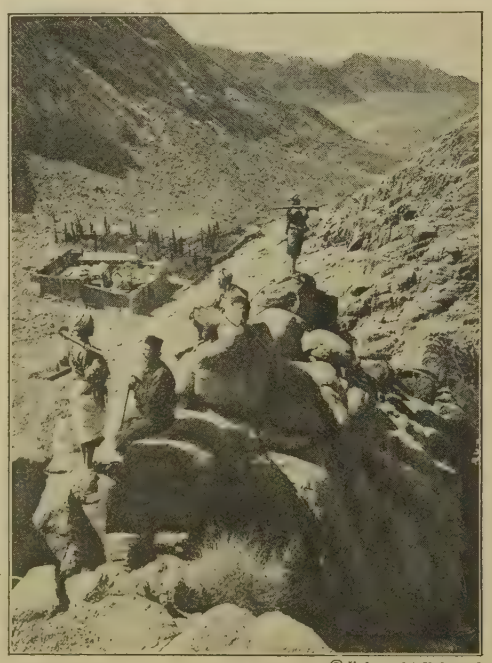

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Fig. 471. The bare, rocky peninsula of Sinai is one of the driest parts of western Asia. This view shows the monastery of the Mount Sinai Monks. Can you explain the climate here?

Monsoons. There is a remarkable seasonal change in the winds about Asia, which can be very clearly understood. In summer the great land mass becomes very warm, and the warm air over it expands and begins to rise. The colder air over the oceans to the north, east, and south is heavier, and therefore it settles and flows in over Asia. The colder inflowing air forces itself under the warmer air and helps to make the warm air rise. The inflowing winds coming from the oceans bring the rains which fall on the mountain slopes.

During the winter the land becomes very cold. The air over the land becomes even colder than that over the oceans, so the movements of the air are reversed. *See map on page 256.* The cold, heavier air over the land area settles and flows outward or seaward. Such winds, coming from the interior of the continent, cannot have much moisture.

Winds that blow toward the land in summer and from the land in winter are called continental monsoons, and these winds have a great influence over the living conditions in Asia.

When these cold winter winds leave the central part of the continent and blow eastward over the plains of Manchuria and China, the temperature falls in those countries. This is the reason why such places as Peking have very cold weather during the winter.

Rainfall. *Use the map on page 256.* The inflowing monsoon winds of the summer season bring most of the rain to Asia. When they reach the coast they begin to rise; the air and the moisture in the air become colder, clouds form, and soon the rain begins to fall. The lowlands bordering the coast are thus well watered, and as the air continues to flow inland the seaward slopes of the mountain ranges receive an abundance of rain and snow.

The heavy rains on the mountain slopes explain the large rivers which make it possible, where it is necessary, to irrigate the rich soils of the lowland plains and thus raise food for the millions of people who live there.

Just over the tops of the mountains, in the interior of Asia, are the desert regions. When the monsoon winds descend the leeward sides of the mountains and cross the plateaus of Tibet, East Turkestan, or Mongolia, they have little moisture, and therefore those lands are arid.

Iran and Arabia do not get strong monsoon winds from the ocean. They are exceedingly dry.

Western Turkestan is a semidesert, because moisture-bearing winds cannot reach it. The tundra portion of Asia has little rain or snow, because the air in very high latitudes is always cold and cannot have much moisture.

While the deserts of Asia are among the driest places known, no other place in the world receives so much rain as the southern slopes of the Himalaya Mountains.

Equatorial rainy belt. All the way around the world, near the equator, there is an equatorial rainy belt. During the year the rainy belt moves northward and southward, following the vertical rays of the sun. It goes north during the northern summer and south during the southern summer. In its belt the air rises and carries with it moisture that commonly forms clouds and then falls as rain. This is the belt where rain usually falls every afternoon. Ceylon, a part of the Malay Peninsula, and many of the East Indian islands have two rainy seasons, because the equatorial rainy belt passes over them twice each year.

Problems and review questions. 1. Why should there be such very different climates in the different parts of Asia? 2. What parts of Asia are the hottest? 3. Where is there the greatest difference between the summer and winter temperatures? 4. What are the monsoons? Explain them.

5. In what part of Asia is the rainfall heaviest? 6. What disadvantages are there in having a very heavy rainfall? 7. Why are the high plateaus of Asia dry? 8. Explain the coming of two rainy seasons in one place in a year.

COUNTRIES OF SOUTHWESTERN ASIA

One of the most interesting parts of Asia is the portion between India and the Ægean Sea. It includes much rugged, inaccessible mountain country, the two extensive desert plateaus of Iran and Arabia, the semi-desert plateau of Anatolia, and the rich lowland area of the Tigris and Euphrates valleys.

Three or four thousand years before Christ several great nations flourished in this part of Asia. They were composed almost entirely of people of the white race, and their civilizations have contributed a great deal to the nations which later grew up about the Mediterranean shores. In this part of the world the Jewish nation passed through its eventful history (Fig. 473).

In the thirteenth century Mongolian invaders from the northeast, of whom the Ottoman Turks are the present representatives, swept over these lands and almost obliterated the civilizations which they found. They adopted the worship of Mohammed, which had originated in Arabia, and during their rule Mohammedanism became the accepted religion in most of southwestern Asia. Since the Mongol invasion the Jews have had no country of their own, and the Armenians, who have held to the Christian religion, have been crowded into a mountain region and subjected to cruel persecution.

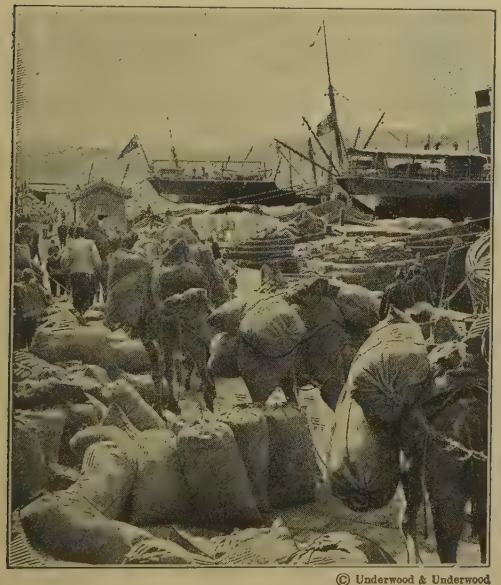

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Fig. 472. The wharves at Smyrna are crowded with camels loaded down with figs and grain for export. Where will these products be sent? What things do the foreign ships bring to Smyrna?

The countries of western Asia made very little progress under the weak government of Turkey. Great irrigation works were abandoned, few railroads were built, and many of the inhabitants emigrated to other countries.

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Fig. 473. Jerusalem, the center of the Jewish nation in Biblical times, is now a typical oriental city of flat-roofed, whitewashed houses, with a mixed population of Jews and Mohammedans. At the left in this view is the dome of the Mohammedan Mosque of Omar, and in the distance is the Mount of Olives

Under Turkish administration little was done to introduce modern methods in agricultural or industrial life.

During the World War Turkey was overcome by the forces of the Allies, and several distinct and independent nations have been established here.

Turkey retains control of the western part of the peninsula between the Black and Mediterranean seas. Most of this country is very rugged. Along the coasts there are a few narrow lowland belts, and here the summers are hot and the winters warm. On the higher lands of the interior, where the Plateau of Anatolia is located, the winters are cold, but the summers are hot and dry. Some portions of the plateau are dotted with tall cypresses and umbrella pines, but most of this region is treeless. Where streams come from the mountains, irrigation is practiced and agriculture is carried on, but in most primitive ways. The soils are rich, and the chief products are tobacco, cereals, cotton, figs, and many varieties of fruit. The cotton industry is increasing. The climate is favorable to mulberry trees, and many people raise silkworms.

Sheep and cattle are raised among the mountains. The Angora goats which live on the plateau supply the hair for mohair cloth. Many beautiful shawls and rugs are woven in Anatolia. On the coastal lowlands large quantities of figs and other Mediterranean fruits are raised. **Smyrna** is the chief seaport (Fig. 472).

The city of Smyrna, with a considerable area of the surrounding country, is now controlled by Greece. In 1925 the people of this area will decide by vote whether they wish to be united with Greece or Turkey.

Armenia. This part of Asia is characterized by gloomy mountains and fertile valleys. It is very hot in summer and extremely cold in winter.

Fully three million people live in this country. Their chief occupations are the care of sheep and goats, the cultivation of grapes, and the raising of maize, cotton, and tobacco. It is not a country of great possibilities, but with a strong and just government the people may live happily in the valleys between the mountain ranges.

Most of the inhabitants are Armenians, but there are also many Turks living here, and Kurdish shepherds make their homes in some of the mountain ranges. There are few roads, and therefore travel is not easy, and it is difficult to maintain a good government.

Erzerum is the leading city of Armenia.

Syria and Palestine. Syria is a tableland bordering the Mediterranean Sea and sloping gently eastward into the Syrian Desert. The southern portion of this tableland is called Palestine or the Holy Land (Fig. 474).

Near the coast the people raise olives, oranges, lemons, and grapes. They also produce large quantities of silk, most of which is sent to France. Farther inland there is some agriculture, but the farming methods are very old-fashioned. Large numbers of the people in these lands are shepherds.

Since the World War an effort has been made to establish a national home for the Jews in Palestine.

Mesopotamia, or the land between the rivers, was once the "Garden of the World." It was the site of the rich and powerful Babylonian Empire, but for hundreds of years this fertile land was almost abandoned. Ruins now mark the sites of the ancient cities of Nineveh and Babylon. Mesopotamia is also known as Iraq.

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Fig. 474. Relief drawing of Palestine. Locate the great trough in Palestine. What river and what seas are in this trough? Compare the elevation of the surface of the Dead Sea with that of the Mediterranean. Describe the location of Jerusalem, Nazareth, and Damascus. What are the chief occupations of the people on the western plains? on the heights of Judea?

Bagdad, familiar to us in the Arabian Nights, lies on both sides of the Tigris River, which is crossed by a bridge of boats. It has a population of about 200,000.

This country has need of a strong government and men with capital and energy to construct and maintain irrigation works. The waters of the Tigris and Euphrates could reclaim the lands of Mesopotamia, and a large population could be supported here. Great Britain now administers the affairs of this country.

MAP STUDIES

1. Make a list of the countries that border on the eastern end of the Mediterranean Sea; on the Black Sea; on the Caspian Sea; on the Persian Gulf; on the Red Sea. 2. Why are there so few navigable rivers in this part of the world?

3. Where do the larger rivers shown on this map get their water? Give at least two examples. 4. What becomes of some of the rivers that flow from the mountains into the deserts?

5. Judging from the location of the cities, do most of the people live near the coast or inland? How should you explain the distribution of settlements? 6. Why are there so few railroads in this part of the world?

7. How do people travel in these lands where there are no railroads and no navigable rivers? 8. How should you explain the location of settlements at the base of mountain ranges? 9. Judging from the products and natural resources, what should you think are the chief occupations of the people in these countries?

10. What products from these countries reach the United States? 11. Should you expect manufacturing to become a leading industry in these countries? Why? 12. Locate the Holy Land on this map.

Home work. 1. Locate on an outline map Smyrna, Damascus, Jerusalem, Bethlehem, Mount Ararat, Bagdad, the Dead Sea, the river Jordan, the Suez Canal, and the Bosporus.

THE NEAR EAST
POLITICAL AND ECONOMIC MAP
Scale of statute miles
0 50 100 200 300 400
Scale of kilometers
0 50 100 200 300 400 500 600
Capital cities
Principal railroads
Land below sea level
Lowlands
Young, rugged mountains
Chief seaports
Navigable rivers
Uplands and plateaus
Old, worn-down mountains
Settled boundaries
Unsettled boundaries
Sovereignty to be determined by popular vote
Boundary of the Zone of the Straits
BLACK SEA
MEDITERRANEAN SEA
RED SEA
PERSIAN GULF
GULF OF OMAN
GULF OF ADEN
ARABIAN SEA
INDIAN OCEAN
CASPIAN SEA
ARAL SEA
TURKEY
ARMENIA
SYRIA
PALESTINE
EGYPT
ANGLO-EGYPTIAN SUDAN
ARABIA
PERSIA
AFGHANISTAN
TURKESTAN
BULGARIA
RUMANIA
GREECE
Dahna Desert
Nefud Desert
Syrian Desert
Salt Desert
Desert of Ahkaf
Longitude East from Greenwich
Petrograd
Archangel
Tsaritsin
Astrakhan
Tiflis
Baku
Erivan
Tabriz
Teheran
Mashad
Bokhara
Khiva
Kazalinsk
Tashkent
Kuldja
Constantinople
Bucharest
Sofia
Odessa
Sevastopol
Rostov
Stavropol
Vladikavkas
Derbent
Krasnovodsk
Askhabad
Merv
Kushk
Herat
Kandahar
Quetta
Bampur
Nasratabad
Birjand
Yezd
Kirman
Ispahan
Kashan
Kermanshah
Hamadan
Resht
Astrabad
Meshed
Barfrush
Lenkoran
Kizil Arvat
Kara Bogas Gulf
Mouths of the Volga
Kara Kum
Kirghiz Steppe
Kara Dagh
Lake Urmia
Lake Niris
Lake Helmand
Lake Mashkhel
Mt. Elbruz 18,465
Mt. Ararat 16,925
Mt. Demavend 18,603
Mt. Sinai 8,368
Dead Sea 1,292 ft. below sea level
83 ft. below sea level
Cairo
Alexandria
Port Said
Suez
Suez Canal
Pyramids
Jerusalem
Haifa
Beirut
Damascus
Aleppo
Antioch
Tripoli
Homs
Hama
Deir
Mosul
Nineveh
Kerbela
Hit
Babylon
Bagdad
Kutel Amara
Hilleh
Shushter
Basra
Koweit
Bushire
Shiraz
Lingeh
Bender Abbas
Lar
Jask
Gwadar
Muscat
Matrah
Sohar
Maskat
Cape Hadd
Aden
Shukra
Mokha
Hodeida
Sana
Shibam
Merbat
Mokalla
Cape Guardafui
Berbera
Harar
Jibuti
Obok
Perim I.
Farsan Is.
Dahlak Is.
Massaua
Asmara
Khartum
Omdurman
Berber
Abu Hamed
Port Sudan
Suakin
Kunfuda
Es Selail
Jidda
Mekka
Medina
Yanbo el-Bahr
Akra
Tebuk
Teima
Hail
Bereide
Aneyzah
Shakra
El Ala
Akaba
El Djof
El Hofuf
Er Riad
El Hauta
Es Sufeineh
Wady Halfa
Aswan
Assiut
Kenen
Suez
Sinai Pen.
Jebel Shammar
Hejaz
Asir
Yemen
Hadramaut
Oman
Trucial Oman
Qatar
Bahrein Is. (Br.)
El Katif
Basidu (Br.)
Sir of Ormuz
Makran
Baluchistan
Kuhl-Dena
Shat-el-Arab
Karun R.
Kerkha R.
Kizil R.
Murad R.
Euphrates
Tigris
Kara R.
Aras R.
Atrek R.
Murgab R.
Helmand R.
Farah R.
Hari R.
Gaud-i-Zirch
Halil R.
Wadi Ermak
Mesopotamian River
Kura R.
Terek R.
Kuma R.
Don R.
Volga R.
Ural R.
Emba R.
Syr
Amu R.
Zerafshan R.
Kara Kum
Kisil Kum
Western Kisil Kum
Transcaspian
Caucasus Mts.
Elburz Mts.
Kara Dagh
Taurus Mountains
Kurdistan
Georgia
Armenia
Turkestan
Persia
Afghanistan
Baluchistan
Transylvania
Bessarabia
Ukraine
Crimea
Sea of Azov
Strait of Kertch
Sea of Marmora
Gulf of Adalia
Gulf of Alexandretta
Gulf of Smyrna
Aegean Sea
Cyprus (British)
Crete
Rhodes
Cotton goods from Europe
Steel goods
Equal rights for all nations
Iron Gate
Bosporus
Dardanelles
Maritza R.
Danube R.
Pruth R.
Dniester R.
Bug R.
Dnieper R.
Donetz R.
Kuban R.
Nile R.
Nile Delta
Tropic of Cancer
1st Cataract
2nd Cataract
3rd Cataract
4th Cataract
5th Cataract
6th Cataract
Quoin
Strait of Bab el Mandeb
Strait of Ormuz
Gulf of Oman
Saukirah Bay
Khorya Morya Is. (British)
Sokotra I. (Br.)
French Somaliland
Italian Somaliland
British Somaliland
Mosera I.
C. Madrak
C. Fartak
C. Hafun
C. Jask (Br.)
C. Elba
Ras Asir
Ras Hafun
Ras Fartak
Ras Madraka
Ras Mohammed
Ras Ormuz
Ras Jask
Ras Gwadar
Ras Muscat
Ras Sharbatat
Ras Sharwein
Ras Sharma
Ras Sharbithat
Ras Sharbithat
Ras Sharbithat

Fig. 475. This is a street scene in Yanbo, one of the coast towns of Hejaz. Of what materials are the buildings made? Why are they not built of wood? Notice the camels in the background. Of what use are the camels to the Arabians? What other animals do they raise?

Fig. 476. These wandering Arabs have pitched their tent just outside the walls of an old fort in one of the desert oases. Can you describe the life of these people? How does it differ from that of the Arabs in the villages and towns? How do these people earn their living?

Problems and review questions. 1. For what reasons are the lands in western Asia especially interesting? 2. What are the chief occupations of the people? 3. Why is this a good region for raising silkworms? 4. Why are there no large cities? 5. Why is there little manufacturing? 6. What are the chief disadvantages of these lands?

7. What do these countries most need to attract more settlers? 8. Describe the great, deep valley of the Holy Land. 9. What religions were founded in this part of the world? 10. Where did the Mongolian invaders who belonged to the yellow race come from? 11. How were the rich soils of Mesopotamia formed? 12. How could the lowlands of Mesopotamia be again reclaimed for agriculture and made to support a large population?

Arabia is a country without a strong or well-organized central government. Most of the people have their homes in the cities or towns in the small and somewhat independent states about the margin of the country (Fig. 475). Those living in the vast desert interior usually follow a nomadic, or wandering, life (Fig. 476). Where springs or wells occur in the desert, there are oases, and in each oasis date palms are grown. The wandering Arabs drive their sheep, cattle, goats, and donkeys from one pasture to another. They ride beautiful horses, which are famous for their speed.

Thousands of the Arabian people make annual visits, or pilgrimages, to Mekka and Medina. Mekka was the birthplace of Mohammed, the founder of their religion. Every Mohammedan wishes to visit Mekka at least once during his lifetime. There is now a railway from Damascus to Medina to help these pilgrims on their journey.

In the extreme south of Arabia the mountain slopes have been terraced, and large crops of coffee are raised, which are exported from **Mokha**. Sea fogs help out the scanty rainfall of this coastal belt.

Hejaz. The people of this country are Arabians. In 1916 they threw off the Turkish yoke and established a kingdom. A national flag was then adopted and a national army formed. Hejaz includes the cities of **Mekka** and **Medina**, and is the most progressive of the independent Arabian countries.

Aden and Oman. The British have a small possession at the southwest corner of the Arabian peninsula, called Aden, which they use as a coaling station. Oman, at the southeast corner, is a small independent state bordering on the Persian Gulf. It has become known for its pearl fisheries. Some of the largest and most beautiful pearls in the world are found in the waters of the Persian Gulf. **Maskat** is the seaport of Oman.

Persia occupies the western part of the Plateau of Iran and the mountain ranges to the north and south. Most of the plateau is so dry that few people can live there. Grazing is the chief occupation, and the shepherds must wander about to find pasture for their sheep and goats.

Many of the mountains are of limestone, into which the rain water sinks easily and flows underground. Wherever an underground river, which may have started in the mountains, comes to the surface, there is a spring, and that means an oasis. In desert places the people can sometimes secure water by digging deep wells. To convey the water long distances without loss by evaporation under the hot sun, they have dug underground channels called *kanats*, into which the water is turned when it is drawn up from the wells. These channels may be traced many miles by the mounds of earth thrown up in excavating them.

Trees that need dry air for their tops and water at their roots grow to perfection in parts of Persia. The

date palm is an excellent example; it seems to flourish in a scorching sun if its roots are wet. Its fruit is spoiled by a single shower. The Persian apricot and mulberry are regarded as the finest in the world. Since good mulberry leaves can be raised, the Persian people have developed a flourishing silk industry. Persian rugs and tapestries are famous. Many of the Persian rugs are named after the places where they are made.

Teheran is the capital and lies at the southern base of the Elburz Mountains, in sight of their snow-capped summits (Fig. 477).

Afghanistan. In the northeastern corner of the great desert plateau of Iran, and extending into and a little beyond the rugged Hindu Kush Mountains, is Afghanistan. Early each summer, when the snows melt in the mountains, the streams bring rich alluvial soils to the lower lands. Near the rivers there are irrigated fields and a few small settlements, but the inhabitants can do little more than raise enough food to live on. Some cattle, sheep, and goats are raised.

Kabul is the capital and is located on the Kabul River, which flows to the Indus. This valley is part of the overland route to India, but in its lower course it is impassable, and travelers must go through a very narrow notch in the mountains, known as Khyber Pass.

Problems and review questions. 1. What makes it difficult to live in Arabia, Persia, and Afghanistan? 2. Why do so many people want to visit Mekka? 3. What is Mokha famous for? 4. What articles from Persia are found in American homes? 5. What do most of the people on the Plateau of Iran do for a living? 6. Locate from memory Mekka, Medina, Mokha, Teheran, Aden, and Maskat.

Home work. 1. Read a sketch of the life of Mohammed. 2. Find out some reasons why the camel can live on the desert.

COUNTRIES OF WEST-CENTRAL ASIA

The central part of western Asia contains a number of small states which were part of the Russian Empire before the World War. They occupy the semidesert lowland of Turan. Here the streams from the mountains flow to inland seas. They never reach the ocean.

Transcaspia is north of Persia and east of the Caspian Sea. It is a very dry district, where the wandering life of shepherds is about all that is possible. It is a thinly settled province.

Bokhara is a prosperous state which has long been somewhat independent. It is famous among Americans and Europeans for the beautiful Bokhara rugs which are woven there. It also produces large quantities of corn, fruit, silk, tobacco, and cotton.

The city of **Bokhara** is a center of Mohammedan learning, containing over one hundred colleges and no less than three hundred and sixty mosques.

Khiva is a small state, west of Bokhara, where cotton and silk are produced in large quantities, and where beautiful rugs are made.

Western Turkestan extends northward from Bokhara to the southwestern boundary of Siberia. It is a land of broad, dry steppes, crossed here and there by rivers. Along the rivers are narrow strips of irrigated lands where the water brings many crops to perfection, gives rise to settlements, promotes trade, and leads to the growth of wealth. **Tashkend** is the capital of Western Turkestan. **Samarkand** is a second important city. In the bazaars of these cities the merchants sell the goods brought by camels over the long caravan routes, as well as the carpets, rugs, and skins brought in by the steppe-dwellers, and the products from the irrigated farm lands.

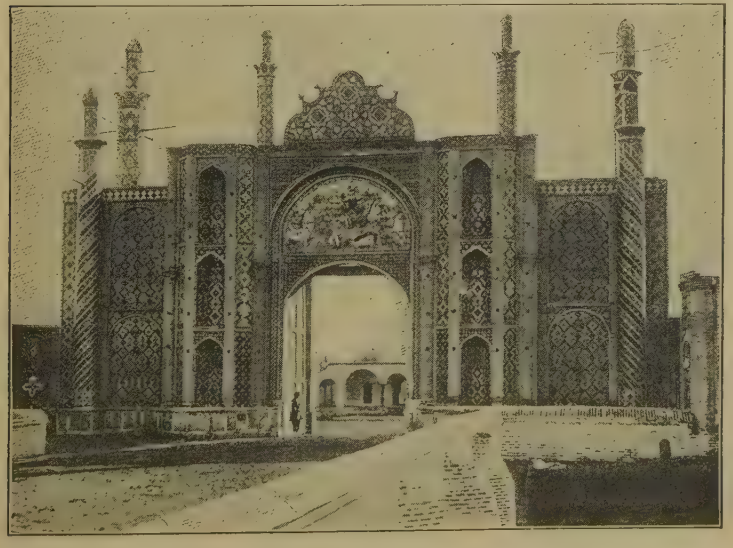

Fig. 477. The government gate at Teheran is a very fine example of Persian architecture. Its decoration shows the same beauty of design which is found in the Persian rugs. Locate Teheran on your map. Why is the Persian capital less important commercially than Tabriz, the chief city of the country?

Fig. 478. This is a formal Persian dinner party. The guests are seated on beautiful oriental rugs, and the dishes are set on mats of Persian tapestry. The servants stand in the background, ready to attend to their masters' needs. All the men wear close-fitting caps, according to the Persian custom

SIBERIA

The completion of the railway from European Russia to Vladivostok marked the beginning of modern Siberia (Fig. 480). This great railway is between 5000 and 6000 miles long. It crosses a land of great opportunities.

For convenience in study Siberia may be thought of in four divisions: (1) the tundra far to the north; (2) the *taiga*, or great forests, just south of the tundra; (3) the steppes, or grassy plains, in the west; and (4) the highlands in the south.

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Fig. 479. This is a picture of Nizhnii Kolymsk, one of the little villages of the Siberian tundra. The photograph was taken at noon on a winter day. Can you explain why it is so dark in the middle of the day? Study the extent of the Siberian tundra on the map opposite page 256. How much rainfall does this region receive? What are the occupations of the people?

Tundra. In the tundra belt in Asia, just as in the belts of similar latitude in Europe and North America, there are two seasons, — a long, dark winter, when temperatures fall many degrees below zero, and a short summer, with almost unbroken daylight (Fig. 479). The frozen ground thaws out in the spring after the snow has disappeared, but the melting extends less than two feet below the surface.

The tundra is overgrown with mosses, lichens, and many dwarf plants. Red berries are abundant on the low bushes, and brilliant Alpine flowers bloom there. There are also swarms of mosquitoes, and many birds that fly far to the north.

The native people of northern Siberia have domesticated the reindeer, and they live partly upon reindeer milk. For food they gather berries, catch fish in the rivers, and kill some of the game birds. These people are wanderers, and as they move southward on the approach of winter they take many of the reindeer with them.

Taiga. Stretching east and west across Asia south of the tundra belt is one of the greatest forests in the world. For the most part it is a dark, cold wilderness about 4000 miles long and from 1000 to 2000 miles wide. A few native huts are scattered along the stream courses, and in winter there are hunters and trappers at work in the forest. Here the wolf, bear, silver fox, sable, and squirrel live; and since it is a very cold country, these animals have heavy coats and yield many of the best furs in the world's fur market.

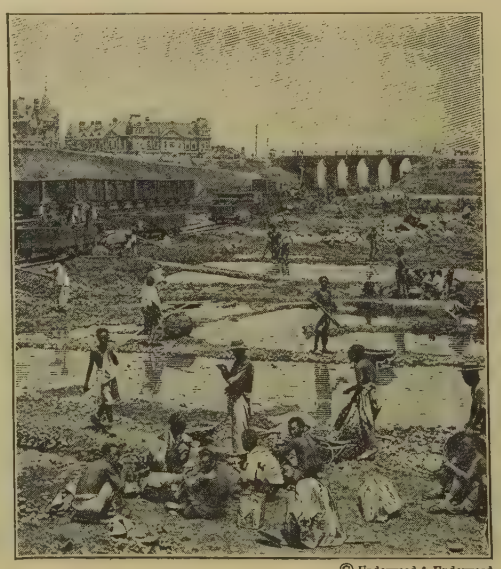

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Fig. 480. This view shows a group of Chinese coolies at work on the eastern end of the Siberian Railroad. Trace the route of this railroad on your map. Explain its importance

Along the southern margin near the railway there are small clearings, and as the population increases, the forest will prove to be a valuable source of timber, and the cleared land will undoubtedly prove good for farming (Fig. 482).

Steppes. Large areas of the Siberian grasslands, or steppes, are good agricultural lands. In the district centering about Omsk there are extensive wheat fields, where modern American harvesting machinery is being used (Fig. 483). Much of the grassland serves as a pasture for dairy cattle, and the rich cream produced is used for making butter. This is the most flourishing of Siberian industries, and shipments of butter are made to points as far away as England.

The drier parts of the steppes are suitable for grazing sheep and goats.

Highlands. In the southern part of Siberia there are young, rugged mountains, and in the east a series of old, worn-down mountain ranges. *See map on page 232.* The mountains contain rich stores of minerals that have not yet been worked, and they furnish pasture for stock during the summer season. The eastern and northeastern portions are heavily forested. The forests include many varieties of fir, oak, pine, and spruce which have a high commercial value.

Rivers. In Siberia there are three very long rivers which rise in the central mountains, where the melting of the snows furnishes water, and flow northward to the Arctic Ocean. To the west is the Ob; next, to the east, is the Yenisei; and farther east is the Lena. Their mouths are north of the arctic circle, and during the winter their lower courses freeze.

As summer advances, the snows melt in the high mountains to the south before the ice has left the mouths of the rivers. The waters come down the valleys until they reach the ice; there ponds are formed, and as the waters rise vast areas are flooded. During that time travel east and west by land becomes almost impossible in northern Siberia.

These great rivers are used as highways of travel in summer and winter. During the summer, when the streams are all open, it is possible to go east or west across northern Siberia in boats, using the tributaries and certain canals. In winter the travelers use sledges.

The Amur is a large and important river highway in the east, and forms the boundary between Siberia and Manchuria.

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Fig. 481. The Russian Cathedral at Omsk is the center of the religious life of the city. Locate Omsk on your map. Why is it important commercially? What are the products of the country surrounding Omsk?

Cities. The four most important cities in Siberia along the route of the Siberian Railroad are **Omsk**, **Tomsk**, **Irkutsk**, and **Vladivostok**. The ending *sk* on a name means that the city or town is on a river of similar name. Thus Omsk is situated on the Om River, Tomsk on the Tom River, and Irkutsk on the Irkut River.

Fig. 482. This is a view in one of the many small villages which are found along the southern edge of the taiga. The wooden houses in these villages are nearly all alike. The sledge is the common means of transportation in the winter. Can you describe the life of the people here?

Omsk is in the center of a wheat-producing district and good grazing country. Very naturally, it has become an important center for dairy products, and the farmers bring their butter and cheese here to be sold. Omsk is also a junction for the east-and-west traffic on the railroad and the north-and-south traffic on the river (Fig. 481). **Tomsk** is in a gold-mining district. It has a university and many other excellent institutions.

Irkutsk is the chief city in the Yenisei Basin and one of the largest cities in Siberia. The smelting of gold ores has become an important industry here.

Vladivostok, the eastern terminus of the Siberian Railroad, is a very important city. It has an excellent harbor and is protected by a fortress. There are flour mills, factories where machinery is made, and plants where bricks are manufactured. The city has a large export and import trade, although the harbor is icebound for three months of the year.

Future. The future of Siberia lies in developing its wealth of natural resources. There are rich beds of coal and iron, deposits of gold, and extensive tracts of forests that have as yet been untouched. Before these products can be given to the world, more people must go to live in Siberia, and means of transportation must be improved.

Problems and review questions. 1. Describe briefly the physical features of Siberia. 2. Where do most of the people live? 3. What are the leading occupations? 4. What resources as yet remain undeveloped? 5. What are the four leading cities? 6. Why is Siberia a land of great opportunities? 7. What does it need, to hasten settlement and development? 8. Name three large rivers of Siberia. 9. What use is made of the mountain streams when they have become rivers in the lowlands? 10. What products has Siberia for export?

Home work. 1. Read an account of a railroad journey across Siberia. 2. Find out about the building of the Siberian Railroad.

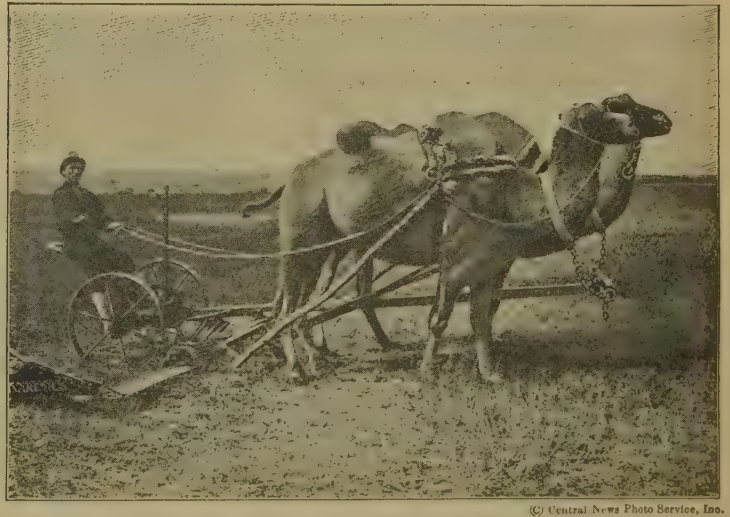

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Fig. 483. This man is a progressive Siberian farmer of the southern steppes. He has purchased an American mowing machine, and by harnessing his pair of camels to it he can cut his grain in a much shorter time than he could when he mowed by hand. What kinds of grain does he raise?

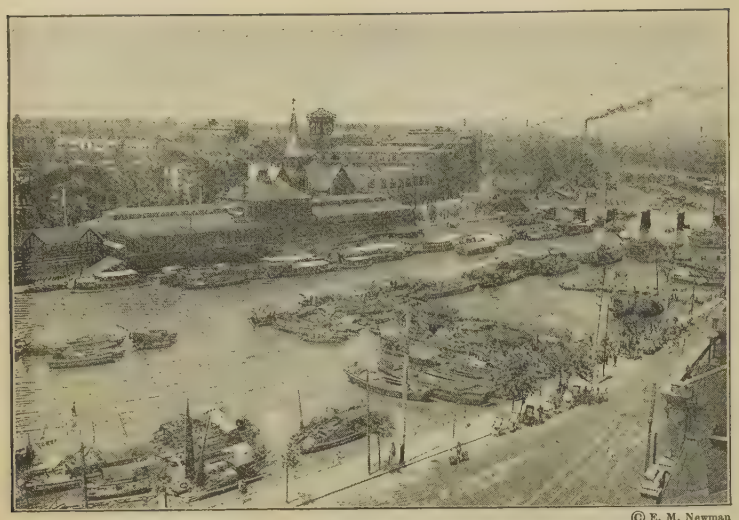

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Fig. 484. Shanghai is the largest port of China and a city of a million people. This view shows Soochow Creek at Shanghai, with public buildings and factories in the distance. What things are being made in these factories? What are the exports and imports of Shanghai?

Fig. 485. This is the government technical institute at Shanghai. It is a modern school of the best kind, where the young Chinese students are trained to be scientists and engineers. Many of the teachers in this school have received part of their education in the United States

THE REPUBLIC OF CHINA

China is one of the countries that the world will watch with the greatest interest during the next fifty years. The people belong to the yellow race; they are patient, careful, and very industrious; they have been very slow and unwilling to change their customs, but wonderful changes are now taking place in the country. It is a land shut in on the west by high mountains and deserts, which have prevented easy intercourse with other people by land. It is bordered on the east by the Pacific Ocean, which until recent times has been a barrier to travel. Thus the Chinese people have been isolated and have developed a civilization quite different from that of the Europeans, who could easily mingle with other peoples.

In many ways their early civilization was remarkable. Its records go back more than two thousand years before Christ was born. They invented paper, gunpowder, and the art of printing, and learned to make and use silk. They were keeping historical records before civilization had begun in Europe. Now the Chinese are beginning to open up their great stores of coal and iron. Railways and steamships have been built, modern schools and universities have been established (Fig. 485), and the larger cities begin to look like the cities of western Europe and North America (Fig. 484).

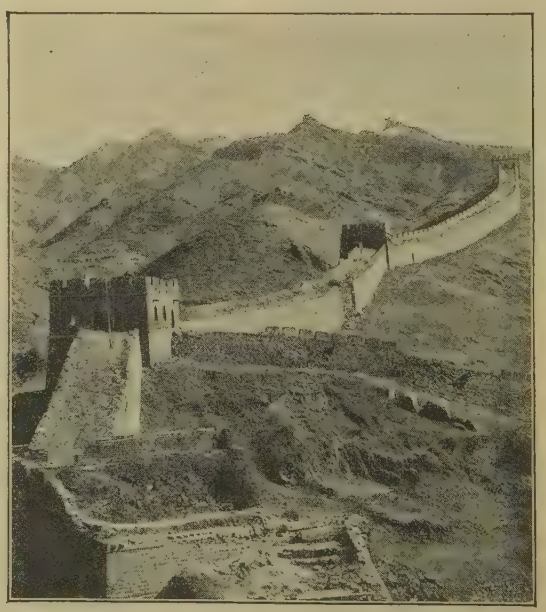

Fig. 486. The great Chinese Wall is 1600 miles long and was begun two hundred years before Christ to defend the empire against invaders. Trace this great wall on your map. Does it form the northern boundary of China to-day?

China is entering the industrial and commercial life of the world, and with its large population, which gives it wonderful man-power, it is destined to play a very important part in the affairs of the world.

Home work. 1. Compare the size of China with that of the United States. Which is the larger? 2. Look up the lengths of the three longest rivers of China. Where do they rank in a list of the ten longest rivers of the world?

Climate. The lowlands on the east receive rains from the southeast monsoon winds during the northern summer. *See map on page 256.* The summer monsoons are warm, and so help to increase the temperature of China during the growing season. When winter arrives, the winds are from the northwest, or interior of the continent, where it is very cold in winter. These winds bring cold weather, especially to Manchuria and the northern part of the Plain of China.

The high mountains to the west have heavy snowfalls, and the melting snows provide water for the rivers. The plateau portions of China are so shut in by mountains that they receive very little rainfall, and they are all deserts or semideserts.

Rivers. The Yangtze is the longest river in China (Fig. 490). After leaving the mountains, where it flows through a deep canyon, it crosses the broad lowland plain to the East China Sea. "Yangtze" is the Chinese word meaning *tea*.

The Hwang, or *Yellow*, river is so named from the great amount of yellow mud that it carries. It has been called "China's Sorrow"; for when it overflows, thousands of people are drowned and vast areas of crops are destroyed. In 1887 a great flood occurred and a million people were drowned. The Amur is another very long river. The rivers of China brought the fine materials from the mountains and made the lowlands.

For nearly four thousand years the rivers were the chief highways of travel in China. Even to-day there are but few railroads for so large and so densely populated a country, and the rivers therefore continue to be of great importance in the domestic, or inland, commerce of the nation (Fig. 490).

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Fig. 487. At this point an opening has been made in the ancient wall around Peking, to allow the railroad to enter the city. China has more than 6000 miles of railroads. Why are they necessary to China's progress?

Natural resources. The rich soils of the lowlands are China's greatest natural resource, and it is the industry of the people and their care of the soils that has made it possible for so many people to live in the country for centuries. In the south valuable forests cover parts of the mountain area. Unfortunately, large areas of China have been stripped of their forests. In those areas much of the soil has been washed away, floods have occurred, and the lands are of little use. Along the seacoast there are several good harbors.

China has large supplies of coal and iron. Coal seams 40 feet thick have been reported. Natural oil, or petroleum, has been found, and deposits of gold, silver, and many other minerals have been located. Mining is certain to develop very rapidly in China during the next few years.

Occupations. Where there are so many people the great problem is to raise enough food, and therefore most of the Chinese are farmers or gardeners. The farms are very small indeed, commonly but three or four acres. Millions are engaged in raising rice (Fig. 489); many work on sugar plantations; others raise wheat, tobacco, or hemp; the gathering of tea employs many hands, and likewise the care of gardens. Rice, wheat, the large and small millet, and the soya bean are so important to the life of the Chinese that they are sacred plants and no one may injure them. Millet is a coarser grain than wheat and not as nourishing. Chinese people raise a great many hogs, for those animals eat coarse food, which is cheap.

While agriculture remains the most important of all occupations in China, in the last few years there has been a notable increase in manufacturing, and we may look forward to a great industrial development in the cities of northern China.

Cities. **Peking** is a very ancient city. It was the capital of the Kingdom of China for three thousand years; for over eight hundred years it served as the capital of the Chinese Empire; and now it is the capital of the Republic of China. The history of this city reflects the history of the nation through a long period of time, during which the people have secured more and more freedom. About the city there is a wall sixty feet in height. The gates in that wall were formerly locked at night, as was the custom in other walled cities of

Fig. 488. The mule litter is often used for travel in China, where good roads are very rare. The passenger sits cross-legged under the canopy, and the little mules trot safely over the narrowest paths

Fig. 489. This man is plowing his rice fields with a rude wooden plow drawn by a water buffalo. The fields are flooded during the planting season, because rice grows best if planted under water

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Fig. 490. These boats are Chinese freight junks sailing down the Yangtze River to Shanghai. What products are they carrying? Why are the Chinese rivers of such great importance to the country?

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Fig. 491. The broad, steep-walled harbor of Hongkong is one of the best in the world. It is a British naval base and a great commercial center. What do you think is the business of the different boats in the harbor? Why is Hongkong a very valuable British possession?

Asia and Europe. The wall about Peking has now been broken, and a modern railroad comes into the city (Fig. 487).

Tientsin is the port of Peking and the outlet of a large part of Manchuria. It is also the northern terminus of the Grand Canal. **Hankow** is the great tea market of China. **Shanghai**, the port of the Yangtze River, is an important commercial city (Fig. 484). The increase in foreign trade at Shanghai has been due largely to the British. **Canton**, located on the delta of the Si River, is the chief seaport of southern China. It is a center of the silk trade and an important manufacturing city (Fig. 493).

The island of **Hongkong** (Fig. 491) is a possession of the British nation. **Victoria** is the capital. This little island is located at the mouth of the Si River and is about 90 miles south of the city of Canton. The British people who live here have established mills for cotton spinning and sugar refining, and shipbuilding and repairing are also carried on. The Chinese silk and tea trade is controlled to a great extent by Hongkong merchants.

Kiaochow is a seaport on the east coast of China and was formerly a German possession. Japan now holds that port and a large part of the neighboring Shantung peninsula, but the Japanese have promised to return that territory to China.

Manchuria is a large province in the northern part of China. It is a part of the Republic of China but has a large degree of independence. The western part of the country is dry, and little but grass grows there. The eastern portion is well watered and suitable for agriculture; it has become very prosperous. In the highlands rich deposits of gold, copper, and lead have been found. Many Chinese farmers live in Manchuria, where they raise millet, wheat, and beans. **Mukden** is the capital.

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Fig. 492. These stone elephants guard the avenue leading to the tombs of the kings at Nanking. The stones on their backs have been tossed there by passers-by to find out whether their wishes would come true. If the stone stays on the elephant's back, it is a sign of good luck

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Fig. 493. The Si River at Canton is crowded with boats of all kinds. Many of the junks serve as homes for the poorer Chinese families, especially those whose daily work is connected with the river in some way. When the children play on the decks, they are tied with long ropes, and each has a strange sort of life-preserver strapped to his back. If he falls overboard, the life-preserver keeps his head above water until someone pulls him out by the rope

Mongolia. West of Manchuria is a vast territory, not very well defined, which is known as Mongolia. It is chiefly a desert country, because it is surrounded by high mountains. There are oases at the foot of the mountains, where springs are located or where streams from the mountains make it possible to irrigate the land. Many of the people raise sheep and horses, which they must drive from place

to place to find good pasturage. **Urga**, the largest town, is the holy city of the northern Buddhists.

Mongolia has been quite independent in its government, and many Russians came into this territory to help develop its resources. Recently, however, Mongolia has asked for a closer association with the government of China proper, and the request has been granted.

Sinkiang. Just east of the Pamir is a dry region known as Eastern Turkestan or Chinese Turkestan. This land and some adjoining districts form the Chinese province of Sinkiang. This province is so shut in by mountains that rain-bringing winds do not reach it. For the same reason it is difficult for people to reach this land. The little towns are near the base of the mountains, where oases are found and water is available. **Kashgar** and **Yarkand** are two walled cities, each located in an oasis.

Fig. 494. This woman is fishing with her trained water birds, called cormorants. At her command they dive, catch the fish, and fly back with them to the boat. About each cormorant's neck is a ring or piece of string to keep him from swallowing the fish. Why are fish so important to the Chinese?

Tibet is a large, semi-independent province of China. It includes the highest plateau in the world. Tibet is completely surrounded by high mountains, and on the south are the magnificent Himalayas (Fig. 469). **Lassa**, the capital, is a picturesque city with many beautiful temples. The temples are gilded and the roofs of the buildings are very commonly red. Lassa is the center of the Buddhist religion and is considered a sacred city.

There is a short, dry summer and a long, cold winter in this plateau country, and therefore little use can be made of the rich soils. The people raise yaks, sheep, and goats. The yak is as important to these people as the reindeer is to the people of the tundra, or the camel to the people of the desert. It has a thick, woolly coat, and the hide is used in various ways, sometimes for clothing, sometimes for making tents or utensils. The people use the milk of the yak and have trained these animals to be beasts of burden. The yak is one of the few animals that can work as beasts of burden at great heights.

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Fig. 495. The sacred Temple of Heaven near Peking is a beautiful triple-roofed tower standing on the highest of three marble terraces. Once a year the emperor used to go to the temple to make a sacrifice to heaven. Since China has become a republic the president still observes this custom

Home work. 1. Read Sven Hedin's description of his travels in Turkestan and Tibet. Get one of his books from some library. 2. Look up Peking in some good reference book and learn about the Forbidden City.

Problems and review questions. 1. Why should the people of the United States be interested in China? 2. What trade have we now with China? 3. What have you seen that surely came from China? 4. What have you eaten that may have come from China? 5. What have you worn or seen other people wear that probably came from China? 6. From what American seaports are vessels sent to China? 7. What are the chief seaports of China? 8. What is the capital of the Republic of China? 9. What is the largest city? 10. What is the British port on the east coast of China? 11. What are the chief natural resources of China? 12. What prevents the Chinese from migrating into the less crowded parts of their country? 13. What is the chief food of the poorer people of China? 14. Name three large rivers of China.

15. What river is called "China's Sorrow"? Why? 16. What are the occupations of the people in the high mountains and plateaus of western China? 17. What does China need most at present?

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Fig. 496. These Chinese children spend part of each day in school. After school they cannot play until they have collected wood enough for the family to burn the next day for cooking and boiling water for their tea

JAPAN

The empire of Japan consists of a chain of islands on the east coast of Asia; it also includes the peninsula of Chosen (Korea). The islands have a combined area about the same as that of California, and a population more than half as large as that of the United States.

The Japanese belong to the yellow race. Like the Chinese, they were isolated, and developed a civilization very different from that of the white people in the Mediterranean region and western Europe. They lived chiefly as farmers, gardeners, and fishermen, and there, in the midst of beautiful surroundings of wooded hills and snow-capped mountains rising above the grass and wild flowers of the lowlands, they became lovers of nature and a most artistic people. About their islands they could watch the ever-changing shades of the ocean, and from nearly every point the snow-crowned peak of Fuji could be seen towering above the surrounding hills. It is not surprising that Fuji became their sacred mountain, and that the Japanese formed the habit of stopping their travels or their daily work to enjoy and worship it.

Until the middle of the last century Japan was closed to all intercourse with the nations of the Western World. But in 1854 Commodore Perry of the United States Navy persuaded the Japanese to enter into relations with our country. This was the beginning of a remarkable change in Japan. Little by little the people took on some of the ways of Western civilization; modern methods of manufacture replaced primitive methods; more machinery was used; huge cotton mills were established; steel works were constructed; science was applied to agriculture and to industry; Japan became a great military and naval power. The Japanese began also to colonize the opposite mainland, and between 1894 and 1905 Japan fought first China and later Russia, finally obtaining possession of the peninsula of Chosen.

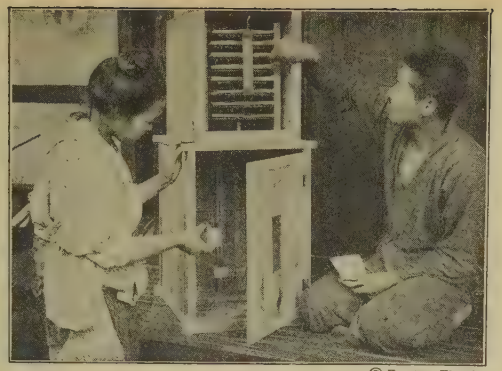

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Fig. 497. Silkworm eggs are put into incubators, where they hatch at the end of three or four weeks. Then they are placed on beds of young mulberry leaves to feed and grow

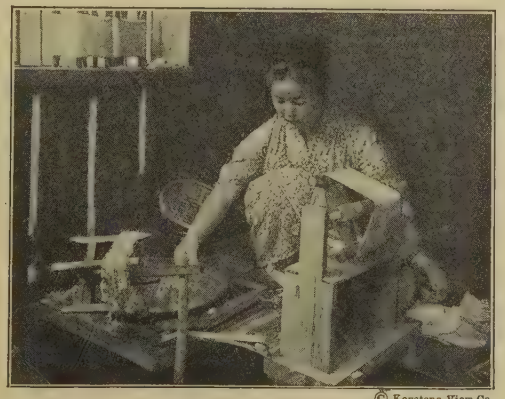

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Fig. 498. In the pan, at the left, are silkworm cocoons which are soaking to loosen the fibers. The Japanese girl is winding these fibers off the cocoons and on the wooden reel

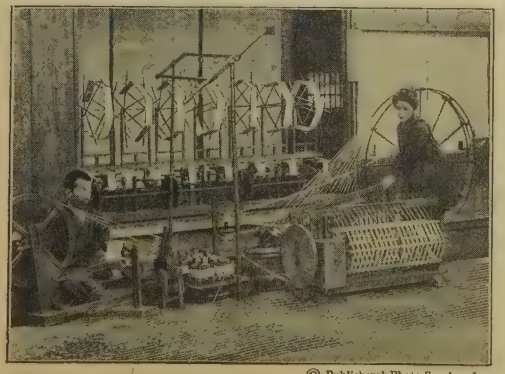

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Fig. 499. This man and his wife are working in their own home, spinning silk fibers into thread. Why is so much silk-manufacturing done in the homes of the people in Japan?

MAP STUDIES

1. Make a list of the chief seaports shown on this map. Opposite the name of the port place the name of the country in which the port is located. 2. Make a list of six products shipped from Japan to the United States. Which of these are products of agriculture? Which are products of manufacture?

3. Make a list of nine products shipped from China to the United States. Which of these are products of agriculture? Which are products of manufacture? 4. Name the large navigable rivers of China. 5. What cities are connected by the Grand Canal of China?

6. Why have the chief railroads of China been built along north-and-south lines rather than east-and-west lines? 7. From the information given on this map, what should you judge to be the climate of Manchuria? of Mongolia? of Japan? Explain your answers.

8. Where might one go in the Far East to see rice growing? silkworms being cared for? tea being prepared for market? 9. To what port might a captain of a vessel turn if he needed coal?

10. If a vessel were going to sail from Australia to Japan, what kind of cargo might be taken? 11. What seaport in China is almost directly north of Manila?

Natural regions. Between the mountain spurs of the islands and between the ranges on the peninsula of Chosen there are small lowland areas where the soils are exceedingly rich. Most of the land, however, is mountainous. The mountains are a chain of volcanoes, of which Mount Fuji is the highest. It takes about ten hours to climb to the summit, and on the rim of the crater there is a beautiful shrine. Many who climb the mountain plan to remain overnight, and see the sun rise out of the Pacific Ocean; it is a glorious sight.

Natural resources. In addition to the rich soils of the lowlands there is an abundance of fish about the shores. The excellent harbors have invited ships from other nations. In the mountains there are large supplies of gold, silver, copper, and iron, and on the mountain slopes there are forests. Some petroleum and an excellent supply of coal have been found. The water-power is another source of energy.

THE FAR EAST
POLITICAL AND ECONOMIC MAP
Scale of statute miles
0 50 100 200 300 500 700
Scale of kilometers
0 100 200 300 500 750 1000
Capital cities
Principal railroads
Lowlands
Uplands and plateaus
Chief seaports
Navigable rivers
Old, worn-down mountains
Young, rugged mountains
Longitude from Greenwich
SEA OF JAPAN
SEA OF OKHOTSK
YELLOW SEA
EAST CHINA SEA
PACIFIC OCEAN
JAPAN EMPIRE
MANCHURIA
MONGOLIA
CHINESE REPUBLIC
FRENCH INDO-CHINA
TIBET
SIBERIA
KAMCHATKA PEN.
SAKHALIN ISLAND
KARAFUTO
KURIL ISLANDS
HOKKAIDO
HONSHU
SHIKOKU
KYUSHU
RIUKIU ISLANDS
TAIWAN (FORMOSA)
HAINAN
Vladivostok
Khabarovsk
Nikolaievsk
Harbin
Tsitsihar
Mukden
Peking
Tientsin
Port Arthur (Ryoshun)
Dairen
Tsingtao
Hankow
Shanghai
Nanking
Canton
Hongkong (Brit.)
Macao (Port.)
Hanoi
Haiphong
Manila
Tokyo
Yokohama
Osaka
Kobe
Nagoya
Kyoto
Sapporo
Hakodate
Aomori
Sendai
Niigata
Nagasaki
Kagoshima
Moji
Hiroshima
Shimonoseki
Fusan
Jinsen (Chemulpo)
Wonsan
Kilju
Vladivostok
Irkutsk
Chita
Blagoveshchensk
Nerchinsk
Urga
Kiakhta
Verkhne Udinsk
Manchuria
Khailan
Aigun
Mergen
Tsitsihar
Harbin
Sansing
Ninguta
Kirin
Changchun
Mukden
Newchwang
Chengteh
Kalgan
Soping
Kuyeh
Suchow
Ansichow
Sachow
Barkul
Hami
Sairussu
Kanchow
Liangchow
Lanchow
Ningsiafu
Sining
Yenan
Taiyuanfu
Paoting
Peking
Tientsin
Chefoo
Laichow
Kiaochow
Tsinanfu
Ichow
Yenchow
Hwaiking
Tungchow
Sianfu
Kaifeng
Hwaianfu
Fengyang
Chinkiang
Soochow
Shanghai
Nanking
Taiping
Wuhu
Anking
Huchow
Hangchow
Wuchang
Hankow
Kingchow
Ichang
Kweichow
Siangyang
Lungngan
Chengtu
Suifu
Chungking
Yachow
Likiang
Ningyuan
Tali
Yungchang
Yunnan
Tungchwan
Kweiyang
Tsuyung
Changsha
Siangtan
Hengchow
Nanchang
Kiukiang
Shaohing
Ningpo
Kingtechen
Wenchow
Foochow
Funing
Kienning
Kienyang
Kaihwa
Linan
Liuchow
Shiuchow
Changchow
Amoy
Swatow
Taihoku
Taiwan
Nittakayama
Takow
Tainan
Pescadores
Kwangchow (French)
Luichow
Pakhoi
Kiungchow
Yulin
Nanning
Wuchow
Kaobang
Langson
Lungchow
Laokay
Yenbay
Luang Prabang
Namdinh
Vinh
Vakiai
Gulf of Tonkin
Bashi Channel
Hokotoor Is.
Okinawa I.
Nafa
Borodino Is.
Miami I.
Van Diemen Str.
Lot's Wife
Yaku I.
Tanega I.
Aoga I.
Hachijo I.
Oki Is.
Matsu I.
Sado I.
Noto Pen.
Iturup
Cape Lopatka
C. Elizabeth
Shantar
Paramoshir
Kuril Str.
La Perouse Str.
Tsugaru Str.
Volcano Bay
Van Diemen Str.
Korea Bay
Gulf of Liaotung
Gulf of Chihli
Yellow Sea
Hangchow Bay
Sanmen Bay
Poyang L.
Tungting L.
Tali L.
Lake Kara Kuku
Koko Nor
Lop Nor
Barkul L.
Ubsa L.
Kossol L.
Kirghiz L.
Karakutsul L.
Dsaschen L.
Kobdo Durga L.
Sogok L.
Pnir L.
Kulun L.
Baikal L.
Lake Pogranichnaia
Ob R.
Yenisei R.
Lena R.
Olekma R.
Vitim R.
Upper Tunguska (Angara) R.
Khua R.
Ingoda R.
Onon R.
Argun R.
Shilka R.
Zeya R.
Selendzha R.
Bureya R.
Amgun R.
Sungari R.
Nonni R.
Hsingan R.
Turuchan R.
Kerulen R.
Orkhon R.
Selenga
Maimachin
Dsaschen R.
Ulasutai
Kanghai Mts.
Altai Mts.
Tannu Mts.
Yablonoi Mts.
Stanovoi Mts.
Sayan Mts.
Baikal Mts.
Nanshan Mts.
Kuen Lun Mts.
Nanling Mts.
Yunling Mts.
Hsingan Mts.
Sikhota-Alin Mts.
Gobi Desert of
Great Wall
Chinese Wall
Yellow R.
Wei R.
Han R.
Hwai R.
Yangtze Kiang
Si R.
Min R.
Mekong R.
Salween R.
Irrawaddy R.
Brahmaputra R.
Indus R.
Tsaidam Basin
Grand Canal
Hwang Ho
Yangtze Kiang
Amur R.
Ussuri

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Fig. 500. These Japanese laborers are setting out young rice shoots in even rows in the mud and water of an irrigated field. Here the rice will grow until it is ready to harvest

Climate. The spring and autumn are the most desirable seasons to make a trip through Japan. June is the wet month, and July, August, and the first weeks of September are very hot in the lowland areas. In general the climate of the islands is mild throughout the year. This is because Japan is surrounded by a great ocean, and weather changes are not so extreme or so sudden as in the interior of great land areas.

Occupations. The population of Japan is very dense, and in order to provide food for the people the soil is cultivated in a most intensive way. Even the mountain slopes are terraced, and walls are built to prevent the earth from sliding. The Japanese produce many varieties of rice, which is the chief food for most of the people (Figs. 500, 501). The tea from Japan is famous (Fig. 502). Indigo, cotton, hemp, flax, and tobacco are also raised. Very few animals are kept on the islands, because animals use large quantities of food. There are abundant fish in the shallow waters around the islands, and fish is one of the chief foods of the Japanese people.

Mulberry trees are grown to provide food for the silkworms. Japan supplies about 30 per cent of the total amount of silk raised in the world, and more than half of all that we receive in the United States (Figs. 497, 498, 499).

The manufacture of paper, matting, pottery, metal goods, and straw braids has long been carried on in Japan. The spinning industry is rapidly becoming more and more important. Silk is manufactured around Tokyo, and large cotton mills are located at Osaka. The raw cotton is imported mostly from India and the United States.

Fig. 501. The Japanese thresh rice by drawing it through wooden rakes. The rice grains drop into the baskets, leaving the straw in good condition for thatching roofs and making hats, baskets, sandals, and mats

Cities. **Tokyo** is the capital of the empire, with a population of over 2,000,000 (Fig. 504). It is one of the foremost cities in the Orient. It has electric cars, modern stores, and excellent train service. The beautiful imperial palace, the home of the emperor of Japan, is in Tokyo. The imperial university is also located in this city, and there are numerous parks, temples, and shrines here.

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Fig. 502. The tea pickers in Japan are mostly women and girls, who work on the hillsides plucking the tender green leaves from the bushes. After they are picked, the leaves are wilted over a fire, rolled to squeeze out the sap, dried, sorted, and packed for export. Why is tea grown on the hillsides in Japan?

Yokohama is the port of Tokyo (Fig. 503) and has an excellent harbor with protected waters. It is the first port reached by trans-Pacific liners from America. In the harbor of Yokohama the traveler will see vessels from America, China, Australia, India, and Europe. **Osaka** is the largest commercial center and one of the most progressive industrial centers. Its population is over 1,000,000. The harbor at Osaka is poor, and most of the trade of this city is carried on through the neighboring port of **Kobe**, which has an excellent harbor. **Nagasaki** is an industrial center and a very old port, where vessels commonly stop to get a supply of coal. **Kyoto**, the former capital of Japan, is an important manufacturing city and one of the chief railway centers.

There are three densely populated areas: the first near Tokyo and Yokohama, the second in the vicinity of Kobe and Osaka, and the third near Nagasaki. *See map on page 256.*

Chosen (Korea). This part of the Japanese empire is chiefly an agricultural land, but the methods of cultivating the soil are backward and primitive. Rice, wheat, beans, tobacco, and cotton are the more important crops. In the mountains gold mining is carried on, and copper, iron, and coal are known to be abundant. The means of communication are poor, and this condition is delaying industrial development. **Keijo** (Seoul) is the largest city and **Fusan**, on the southern coast, is the chief port.

The Koreans belong to the Mongolian race but form a nationality distinct from that of the Japanese or Chinese.

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Fig. 503. This is a street scene in Yokohama. Notice the curious signs over the shops and the jinrikishas which the Japanese use for riding about the city. What is the population of Yokohama? Can you explain its commercial importance?

Taiwan (Formosa) was ceded to Japan by China in 1895. In the dense forests on this island some of the tribes are still uncivilized. Camphor is the chief product, and nearly all the camphor in the world comes from this island. On the lowlands bordering the coast the inhabitants raise large crops of rice and sugar cane.

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Fig. 504. Many of the streets in the business section of Tokyo have a very modern appearance. The office buildings, stores, electric-car lines, and telegraph poles are not unlike those of an American city. Locate Tokyo on your map. How does its population compare with that of the largest cities in the United States?

Future. There is every reason to believe that Japan is destined to become one of the world's great industrial nations. The Japanese people have already proved themselves very skillful in the industrial arts, and the amount of manufacturing increases every year. Power is provided by the coal fields, the natural oil, and the many streams, some of which are already harnessed to produce hydroelectric energy. Agriculture will always be important in such a densely populated country, but as years go on it is likely that a larger and larger proportion of the Japanese people will be engaged in industrial work.

Problems and review questions. 1. Why do Japanese young men come to our universities for an education? 2. What are the chief occupations of the Japanese? 3. What does Japan most need? 4. What industries have the Japanese undertaken? 5. Name three important cities. 6. What winds bring rain to Japan? 7. What land on the continent of Asia does Japan possess? 8. Where does the emperor live? 9. What cities are leading industrial centers?

INDO-CHINA

Indo-China comprises a group of small countries between the South China Sea and the Bay of Bengal. The countries on the east are under the protection of France. Siam is an independent kingdom, and Burma is a part of India and so under British rule.

French Indo-China. In the northern part of French Indo-China there are several mountain chains, and the rivers which flow southward bring rich soils to the lowlands. In the mountains the rainfall is heavy because of the monsoon winds of the summer months. Most of the people live on the lowlands, where many of them are engaged in raising rice, fruit, cotton, and sugar. These are just the products that would be expected on a warm, moist lowland. Coffee and tea are the chief products raised on the higher lands. Some fishing is carried on in the lakes and streams of the deltas and along the coasts. The only settlements are near the rivers. These villages are shut in by dense tropical forests which yield bamboo and other woods.

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Fig. 505. A Korean house is built by weaving a latticework of grass ropes between wooden posts and beams, and building against it a wall of stones held together by mud plaster

ASIA
POLITICAL AND ECONOMIC MAP
Scale of statute miles
0 100 300 500 750 1000 1500
Scale of kilometers
0 200 600 1000 1500 2000
Capital cities
Chief seaports
Principal railroads
Navigable rivers
Land below sea level
Lowlands
Uplands and plateaus
Old, worn-down mountains
Young, rugged mountains
ATLANTIC OCEAN
EUROPE
ASIA
AFRICA
INDIAN OCEAN
PACIFIC OCEAN
ARCTIC OCEAN
Moscow
Peking
Tokyo
Yokohama
Delhi
Bombay
Calcutta
Madras
Colombo
Singapore
Rangoon
Bangkok
Hanoi
Manila
Shanghai
Hongkong
Canton
Tashkend
Baghdad
Teheran
Mecca
Aden
Karachi
Vladivostok
Harbin
Mukden
Sianfu
Hankow
Lhasa
Kabul
Kandahar
Lahore
Amritsar
Calcutta
Rangoon
Bangkok
Singapore
Batavia
Surabaya
Manila
Hongkong
Shanghai
Tokyo
Yokohama
Osaka
Kobe
Nagasaki
Vladivostok
Harbin
Mukden
Peking
Sianfu
Hankow
Canton
Hongkong
Macao
Hanoi
Haiphong
Saigon
Bangkok
Singapore
Rangoon
Calcutta
Delhi
Bombay
Madras
Colombo
Karachi
Aden
Mecca
Medina
Baghdad
Teheran
Tashkend
Moscow
Petrograd
Archangel
Omsk
Irkutsk
Yakutsk
Vladivostok
Harbin
Mukden
Peking
Sianfu
Hankow
Canton
Hongkong
Manila
Singapore
Batavia
Surabaya
Rangoon
Bangkok
Calcutta
Delhi
Bombay
Madras
Colombo
Karachi
Aden
Mecca

Siam. Just west of French Indo-China is the little independent kingdom of Siam. This is one of the countries where the elephant is used as a draft animal and where a few so-called white elephants have been captured. The figure of an elephant on the Siamese flag is an expression of respect and appreciation for that animal.

British, French, and American advisers have assisted the government of Siam. Many modern methods of agriculture, lumbering, and mining have recently been introduced. Teak is the most important tree, and large quantities of teakwood are brought down the rivers for export.

The capital of Siam is **Bangkok**, a seaport from which large quantities of rice are exported.

MAP STUDIES

1. Make a list of the chief seaports of Asia. Opposite the name of each port place the name of the country in which it is located. 2. What countries appear to be actively engaged in foreign trade? 3. What are the chief products sent from Asia to the United States?

4. What country sends us tea? silk? tin? 5. To what port should you send for jute? 6. Trace the route of vessels from the North Sea to India and China. *See Appendix, Plate B.*

7. Judging from the animals raised in the interior of Asia, what can you say about the climate of that part of the continent? Where should you expect to find a wandering population? 8. Why are the settlements in the desert regions so often near the foot of mountain ranges?

9. What country appears to be best supplied with railroads? 10. Why are there so few railroads in most parts of Asia? 11. What natural resources along the Siberian Railroad should lead to the economic development of that part of the continent?

12. Judging from this map, what parts of Asia should you think are most densely settled? Why? 13. Where within the area of this map do the people obtain pearls? whales? spices? rubber? furs? dates? 14. What countries have navigable rivers? 15. What are the chief exports and imports of India?

16. Which is farther from the equator, the capital of India or New Orleans? *See western margin of map.* 17. Which is farther from the equator, the capital of China, the capital of Japan, or San Francisco? 18. Compare the latitude of Panama with that of the capital of Ceylon.

Fig. 506. This is part of the busy water front at Singapore, which is often called the "Gibraltar of the East." Study the location of Singapore and explain this name. Why is Singapore one of the great commercial cities of the world?

19. What large seaport is located very near the tropic of Cancer in India? in China? 20. What possessions of the United States appear on this map? 21. What countries in Asia should you most like to visit? 22. Why have you become interested in those countries?

Home work. Arrange in a classified list the names of the articles you have seen that came from Asia. Keep the foods together; so also the articles of clothing, of ornament, etc. Write in another column the names of the countries from which these things came.

Review questions. 1. What European nations are most interested in Indo-China? 2. What are the products of the lowlands? of the forests? 3. What winds bring rain to these countries? When? 4. Where did the soils of the lowlands come from? 5. How is the elephant used in Siam?

THE MALAY STATES

The Malay Peninsula and the neighboring islands are divided into ten states. Most of these states are directly or indirectly under British control. Four of them are organized as the **Federated Malay States**, and they have the complete protection of Great Britain. The British colony in this region is known as the **Straits Settlements.**

The Malay Peninsula is so far south that the climate is warm all the year. It is in the monsoon belt, so there are heavy rains and therefore dense forests and jungles. The cultivation of plantation rubber is one of the leading industries. It costs less to produce a pound of plantation rubber than a pound of forest rubber. For this reason, and because of the cheap labor in this part of the world, the yield of plantation rubber now far exceeds that of forest rubber. Large quantities of spice, tapioca, coffee, and rice are also raised. More than half of all the tin produced in the world each year comes from the mountains of this peninsula and from small islands near the coast. Most of the tin is found in stream gravels.

Singapore, on an island near the extreme southern end of the peninsula, is the capital of the Straits Settlements, and it commands one of the most important sea routes in the world (Fig. 506). Vessels pass from the Indian Ocean through the Malakka Strait to the Philippines, to China, and to Japan.

Home work. Find out what strongholds the British have on the route from London to Hongkong.

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Fig. 507. These are Hindu pilgrims at the ghats, or bathing places, of Benares. Many of them have come from distant parts of India, for Benares is their holy city, and every good Hindu must bathe at least once in the sacred waters of the Ganges to wash away his sins

INDIA

The Indian Empire includes the great peninsula of India and those adjacent lands which are directly or indirectly under British control. Burma on the east, Baluchistan on the west, and the small state of Sikhim in a pass to Tibet are thus parts of India.

People. There are many British people in India. Most of them are government officials or soldiers, but some are tradesmen. The king of Great Britain and Ireland has the title of "Emperor of India," and he appoints a governor-general, or viceroy, of India, who usually serves for a term of five years.

About 70 per cent of the inhabitants of India are Hindus (Fig. 507), who belong to the white race and follow in their religious beliefs the teaching of Brahma. This religion teaches the doctrine of *caste*, or class distinctions. Some are born in a high caste, others in a low caste or in some intermediate caste. Those who are members of one caste cannot associate with members of another caste, or class. This doctrine is quite opposed to our belief that all men are born free and equal. Brahmanism has helped also to keep many superstitions alive among the people.

Tropical jungles. In the great jungles of India there yet remain many tigers, leopards, bears, and elephants. There are poisonous snakes here, too, and thousands of people and millions of animals die each year from snake bites. The cobra, one of the most dangerous snakes in the world, is a sacred animal. The native people, because of their religion, would not kill an animal, but they like to have other people kill this snake. The cow and the monkey are also sacred animals in India.

There are numerous insects in this hot, moist land, and they carry disease just as they do in all tropical regions.

Climate. When the monsoon winds of the summer season strike the high Himalaya Mountains, they cause heavy rains. Forty inches of rain falling in one day has been recorded at one place on the southern slopes of the mountains. The rainfall during a year on the southern slopes of the Himalaya Mountains measures from 400 to 500 inches, and in very wet years it has been known to reach 600 inches. Such heavy rains mean that in places all of the soil is washed from the mountain slopes, leaving them so bare that nothing can grow there. The soils washed from the Himalayas are spread out over the lowlands of northern India.

The heavy rains on the mountain slopes explain the large rivers which make it possible to irrigate the rich soils of the plains and thus raise food for the millions of people who live there. During the summer season rains fall on the higher parts of the Plateau of India. Before the people of India learned to store the water and to irrigate the lands, terrible famines often occurred. Famines are not so bad now, because of the reservoirs and because more railroads have been built and help can be sent to the people.

The part of India which lies south of the Himalayas is never very cold, because its latitude is low and it is sheltered from the cold north winds by the mountains. It is never so hot, however, as the plateaus of Iran and Arabia, because of the sea breezes which always help to moderate a climate. Above 7000 feet the climate in India is suitable for Europeans and Americans.

Natural regions. The natural divisions of India are very clearly defined. In the north are the bold and rugged slopes of the Himalaya Mountains. These are the highest mountains in the world, and they rise abruptly

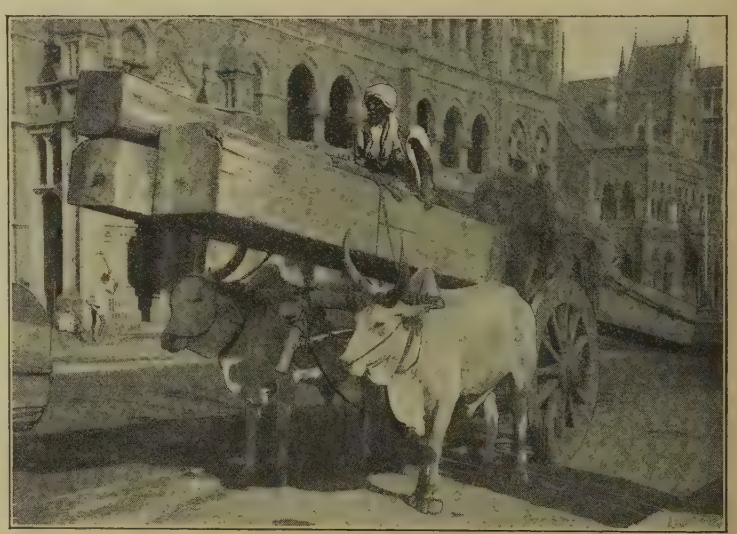

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Fig. 508. The oxcart is a common sight in the streets of Bombay, where the humped oxen are used very generally as draft animals because of their great strength. Notice the modern public buildings in the background of this view. How does Bombay rank in size among the cities of India?

from the broad lowland plain of northern India. This fertile and very densely populated lowland plain extends from the base of the Himalaya Mountains southward to the Plateau of India, spreading out eastward to the mountains of Burma and westward to the highlands of Baluchistan.

The three great rivers of India — the Ganges, the Brahmaputra, and the Indus — rise in the Plateau of Tibet and, after leaving the Himalaya Mountains, cross this lowland plain to the sea.

In the portion of the plain made by the Ganges and Brahmaputra rivers the climate is sufficiently moist to permit agriculture, but irrigation is practiced to supplement the rainfall.

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Fig. 509. This man is at work at his bench carving an elephant out of ivory. The people of India have been famous always for their delicate carving and exquisite metal work

The seaward portion of the Plain of the Indus is dry, and as great quantities of food cannot be raised there, this district is not so densely populated as the Plain of the Ganges.

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Fig. 510. These elephants, which belong to the sacred temple at Kandy, Ceylon, are having their afternoon bath. The elephants in India are trained by the natives to do many kinds of hard work

The vast Plateau of India, or the Dekkan, as it is often called, forms the greater part of the peninsula of India. In some parts of this plateau the surface is flat, but in many places it is broken by rugged ridges of bare rock.

Natural resources. The rich soils that have been washed from the highlands by the rivers and spread out to make the lowlands are the most valuable of the natural resources of India.

Coal, gold, and petroleum are the three most important mineral resources. There are, however, many other minerals in this country. The forests of India are also very valuable.

Occupations. The cultivation of the soil is of first importance and occupies the time of most of the people. The raising of large quantities of sugar, rice, tea, wheat, and cotton makes it possible for so many people to live here. Jute fiber made from the jute plant is used in manufacturing burlap, twine, paper, and many other useful articles. Next in importance is the pasturing of stock. Forestry also furnishes employment to a great number of men. Nearly two hundred and twenty-five million people engage in agriculture, stock-raising, or forestry. That is more than twice the number of people living in the United States.

In plowing and cultivating the soil the water buffalo and humped cattle are generally used. Elephants do the heavy work, much as horses do in some countries. Horses are used for riding, and cattle are used almost entirely as draft animals or as beasts of burden. The buffalo is the common draft animal in the very wet places, but the camel is used in the very dry places.

There are many people in India who have learned the decorative arts. There are those who do carving in ivory (Fig. 509), and others who do beautiful work in embroidery and in making fine silk and cotton cloth. Excellent carpets are also made in India. The cotton and jute mills employ half a million people. Most of the arts have been conducted in a very primitive way, but to-day machinery is being introduced.

Cities. **Calcutta** is the largest city and the most important seaport (Fig. 511). Until 1911 it was the capital of India, but **Delhi** is now the capital (Fig. 512). **Bombay** is a very busy cotton-manufacturing center (Fig. 508). The cotton comes from the lowland northwest of the Dekkan. **Madras**, which is located on the eastern side of the peninsula, serves as the port for southeastern India.

Courtesy of Williams, Brown & Earle

Fig. 511. This is one of the beautiful parks in Calcutta. In the background is the temple, built in the elaborate style which is characteristic of the native Indian architecture. Calcutta was formerly the capital of India and is noted for its fine buildings. What is the present capital of India?

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Fig. 512. This is a street in Delhi, the capital of India. In the background are the domes and minarets of the famous Jama Masjid Mosque, said to be the oldest mosque in the world. In summer the residence of the government is moved from Delhi to Simla. Can you explain why?

Burma. Burma is a land of narrow valleys and heavily forested mountains, with a population of about twelve million people. Far back in the mountains there are uncivilized tribes and wild beasts like those in the forests and jungles of other parts of India. Teak, rubber, and rice, but chiefly rice, are the leading products of Burma, and rice is the chief export. The lowlands are hot and moist, and near the coast the rainfall is from 100 to 200 inches a year. *See map on page 256.*

Baluchistan. The plateau portion of western India is a part of the Plateau of Iran; it is a stony desert, frozen in winter and very hot in summer. There are a few oases near the base of the mountains, and each oasis is marked by palm trees. Where the land is well watered, excellent crops are raised. Large quantities of dates are produced and packed for shipment.

Sheep and goats are cared for by the native people, who drive them from place to place in search of grass. Both Burma and Baluchistan have prospered under British rule. Railroads have been built, irrigation works improved, and disease and famine checked, and the populations have increased.

Ceylon. The island of Ceylon has a small lowland in the north where the climate is tropical, and rice, rubber, cacao, and coconut palms are raised. The central and southern parts of the island are occupied by a mountainous plateau. On the southwestern slopes of the plateau are great tea plantations. The abundant rainfall on these slopes is so favorable to the growth of the tea that the leaves can be gathered every two weeks. The plateau is also rich in minerals and precious stones. The chief mineral is graphite, and Ceylon is the leading graphite-producing country of the world. **Colombo** is the principal city of Ceylon (Fig. 514).

Problems and review questions. 1. In what part of India do most of the people live? 2. What are the chief foods? 3. What are the chief products for export? 4. When is the rainy season? Why does it occur then? 5. Why are there very heavy rains on the south slopes of the Himalaya Mountains?

6. In what part of India is it best for Europeans or Americans to live? 7. What are the chief occupations of the people in India? 8. Why are there famines in India? 9. How could they be avoided? 10. Name the capital and the leading seaports.

11. Why is it never very cold in southern India? 12. What have you ever seen that came from India?

Home work. 1. Read "Kim," by Rudyard Kipling. 2. Find out how sago grows; how the native people prepare it; how we use it in the United States.

SMALL COUNTRIES IN THE HIMALAYA MOUNTAINS

Nepal is an independent kingdom in the Himalaya Mountains, 500 miles long and 150 miles wide. The inhabitants are a very busy people. They raise cattle, wheat, rice, tobacco, and spices. They export some of these products and take in exchange sheep, goats, sugar, oils, and manufactured goods.

Bhutan is another independent state among the Himalaya Mountains which is closed to Europeans. It has wonderful mountain peaks and glaciers and a great variety of vegetation.

It is very interesting to find in the highest mountains of the world small groups of people who would rather be independent than to belong to a large and powerful nation.

Home work. Find other examples of liberty-loving people who have established independent nations in mountain countries.

Courtesy of Williams, Brown, & Earle

Fig. 513. This is the market place at Quetta in Baluchistan. Quetta is a strongly fortified British military station and is connected with the port of Karachi by a railroad. Locate Quetta on your map. What things should you expect to find on sale in the bazaars of the market place?

EAST INDIES

Most of the islands southeast of the Malay Peninsula and north of Australia belong to the Dutch people. *See map on page 250.*

The islands are mountainous, and most of the mountains are of volcanic origin. The cultivation of rubber is a leading industry. The rubber plantations on these islands and on the Malay Peninsula are the chief source of the world's rubber supply. Petroleum is a second product of importance. The most valuable oil fields are in Sumatra and Borneo. On the narrow lowlands, where it is always warm, the native people raise the sago palms from which they get a large proportion of their food. Spices are also grown.

The island of Java is the most advanced in the group. The soil is very fertile, and every tropical and temperate crop can be grown on the island if land high enough above sea level is selected. The principal exports are sugar, coffee, tea, indigo, cinchona, tobacco, rubber, copra, and tin.

The capital of Java is **Batavia** (Fig. 515).

It is always hot and moist in this part of the world, and Europeans do not enjoy the climate. A few, however, must live here to direct the native laborers.

Review questions. 1. What European nations hold possessions in the East Indies? 2. Describe the physical form, or relief, of the islands. 3. Describe and explain the climate. 4. What are the chief occupations? 5. What are the chief exports?

Home work. 1. Make a list of the common domesticated animals of Asia, and indicate what each one is valuable for. 2. Bring your pictures of Asia to school and plan a picture exhibit.

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Fig. 514. This is the passenger landing and customhouse at Colombo. Beyond is the harbor, which is protected by three great breakwaters. The southwest one breaks the force of the waves in the southwest monsoon season. In what months is this? What are Ceylon's exports? Where are most of them sent? What are its imports?

Fig. 515. This is a canal in Batavia, the capital of Java. Batavia is the great trading center for the Dutch East Indies. Its canals are full of little boats laden with the products of the other islands, waiting to be exported. What are some of these products?

GENERAL REVIEW FOR ASIA

1. What is the most nourishing cereal grown on the steppes? 2. What conditions are favorable for raising rice? 3. Where is the *taiga*? 4. What palm thrives in rainless regions but needs water at its roots? 5. What part of Asia has conditions favorable for raising grapes, olives, and figs?

6. Rice, wheat, the large and the small millet, and the soya bean are the five sacred plants in what country? 7. In what country are cows, monkeys, and the cobra sacred? 8. On the leaves of what tree are silkworms fed? 9. What country produces most of the silk sent to the United States?

10. What is the most important animal on the tundras? on the richer steppes? on the poor steppes? in the high mountains? in the desert? on the high Plateau of Tibet? 11. What animal can bear extreme cold? What one can bear extreme height? What one can bear extreme drought?

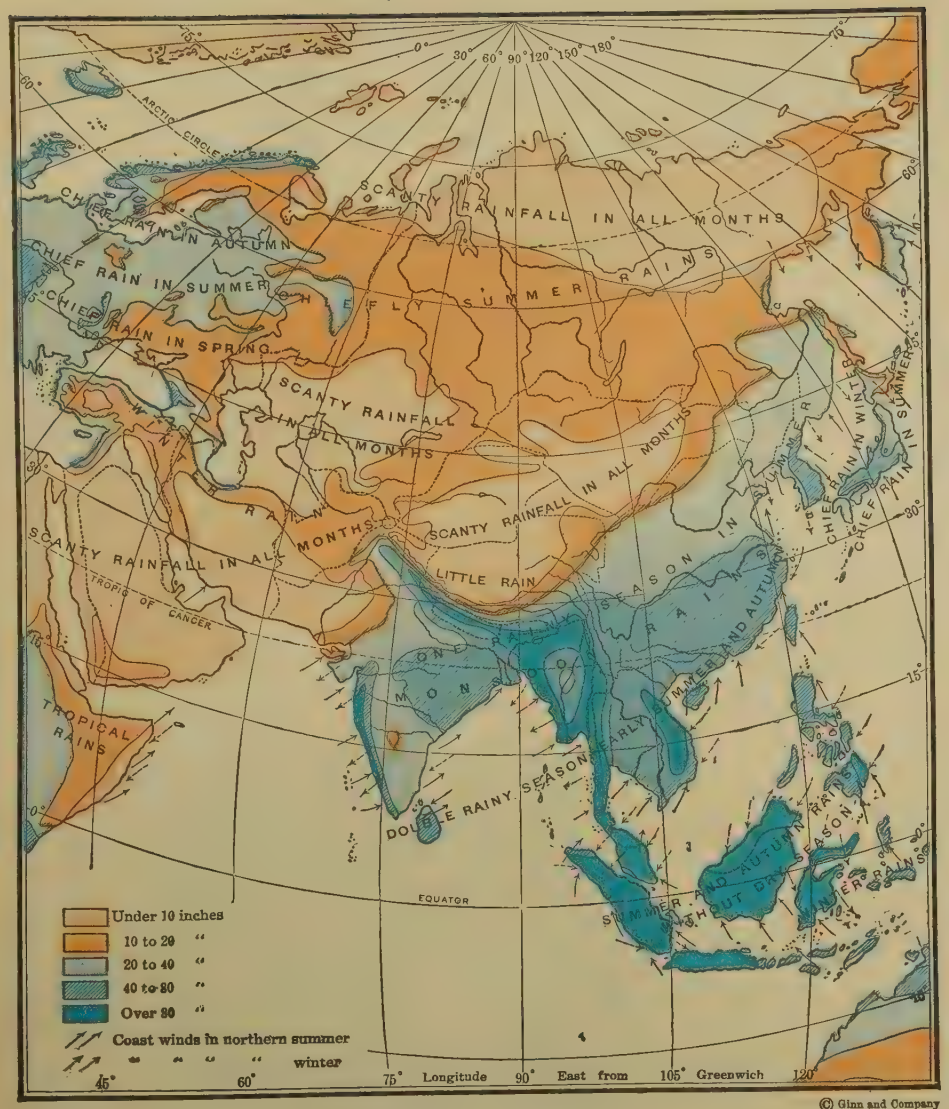
12. What animals can best bear intense heat? 13. What are the two chief occupations of the people of Asia? 14. Explain the oases in the deserts. 15. Name and locate five important seaports. 16. Why are there so few large interior cities? 17. What countries have good industrial prospects?

18. What parts of Asia will remain unsettled? Why? 19. What winds are most helpful to agriculture in Asia? Why? 20. Where do the greatest extremes in temperature occur? Why? 21. Where are the highest mountains in the world? 22. Where is the "Roof of the World"?

23. Name and locate five long rivers in Asia. 24. In what country is there coal and iron in abundance and plenty of cheap labor? 25. In what countries of Asia are beautiful rugs made? 26. What European nations have large possessions in Asia? 27. What country owns most of the East Indies?

28. Where is nomadic life common? 29. Where are the chief settlements in Siberia? 30. What are the chief products that the United States imports from Asia? 31. From what part of Asia does most of the world's tin come?

32. What will be of the greatest help to Asiatic countries in their industrial and commercial development? 33. From what American ports do vessels start for Asia?



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Average annual rainfall in Asia

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Distribution of people in Asia

COMPARATIVE MAP STUDIES

1. The relief and vegetation map shows the summer conditions. Why is it difficult for vessels to pass north of the continent? 2. How should a winter map differ from the summer map?

3. In what waters near Asia should you expect to find good conditions for fishing? Why? 4. Why should the great forests of Siberia dwindle to the north and the tundra country extend along the margin of the Arctic Ocean? 5. Why should the plateaus of Tibet and Mongolia and much of the central part of Asia receive so little rainfall? 6. In looking at the relief map, where should you expect the heaviest rainfall on this continent to be? 7. The central part of Asia is very warm during the northern summer. Do the coast winds in summer blow toward the land or toward the sea?

8. In winter the central part of Asia is very cold. Notice in what direction the coast winds blow during that season. What are such seasonal winds called? 9. Do most of the people of Asia live in wet countries or in dry countries? 10. Are the dense populations in Asia on lowlands, on plateaus, or in mountain regions? 11. What are the favorable geographic conditions which enable great masses of people to live in a region?

12. Account for the belt through Siberia where the population is more dense than it is to the north or south. 13. What may be said as to the number of people per square mile in lands that receive less than 10 inches of rain each year?

ASIA
Scale of miles
0 200 400 600 800 1000 1200 1400
Water less than 500 feet deep
Land below sea level
Floating ice
Tundra
Wet-weather streams
Grasslands
Temperate forests
Tropical forests
Oases
Semideserts
Deserts and barren mountain slopes

AUSTRALIA, NEW ZEALAND, AND PACIFIC ISLANDS

AUSTRALIA

Australia, the smallest of the continents, is part of the British Empire and a land from which we receive large quantities of wool, hides, skins, and copper. It is the only continent, except uninhabited Antarctica, which is entirely within the southern hemisphere. Study each of the pictures from Fig. 516 to Fig. 520.

People. Most of those who have gone to live in Australia are English-speaking people, and they have discouraged the importation of negroes from Africa and of laborers from India and China. More help is needed in order to develop the great natural resources of the country, but the white inhabitants prefer to develop them less rapidly and to keep the country for those who use the same language and have similar ideals of social, industrial, and political life.

Fig. 516. Australia raises more sheep than any other country in the world. This view shows a group of the famous merino rams which are pastured there. The thoroughbred merinos have the longest, finest, and heaviest fleece of any breed of sheep. Such rams as these yield from thirty to forty pounds of fine wool each. Why does Australia lead the world in the production of wool?

In central and western Australia there are many tribes of native people who live in most primitive ways. Their relation to the native peoples of New Zealand, of the islands of the Pacific, of Asia, and of Africa is not known, but they are usually classed with the black race.

Natural Regions

Australia is easily divided into a few distinct natural regions. *See map on page 258.*

The **East Australian Highlands** are made up of a series of low mountain ranges that are heavily forested. The Great Dividing Range, the New England Range, and the Blue Mountains are included within this highland region.

The mineral resources and the water-power of this region encourage mining and manufacturing, and have led to the great industrial development of New South Wales, Queensland, and Victoria.

Most of the white people of Australia live in this portion of the continent, and it is rapidly becoming more and more densely populated. *See map on page 265.*

The **Victorian Highlands** extend in an east-and-west direction near the southern end of the East Australian Highlands, and just south of the Victorian Highlands is the broad, rich Valley of Victoria.

The **Great Plains**, with a general elevation of from 500 to 1000 feet above sea level, occupy a central position in the eastern half of the continent. Fine materials have been washed from the higher lands and spread out on these plains, so that now there is a rich alluvial soil in this region.

When white people first came to Australia, they found a scanty growth of poor grass on the plains; but most of this land has been planted with European seed, and now a great part of the Great Plains region is an excellent pasture land (Fig. 516). Over this region graze flocks of merino sheep, which yield the finest wool in the world. Much of this fine wool is used in the mills of England and America. Dairy farming is being rapidly developed in the southern portion of these plains (Fig. 517).

The plains have a native plant, the saltbush, that is very valuable in stock-raising. The plant contains so much salt that the animals eat it for their salt supply. This bush is being introduced into the United States in the dry sheep-raising lands of the Southwest.

In the northern portion of the plains it is possible to get water by drilling deep wells. Several wells reach as far as 5000 feet below the surface, and the waters secured are used for irrigating the lands. In the southern portion of the plains, which is shut off from the southeast rain-bringing winds by the highlands, irrigation is necessary.

The **South Australian Highlands** are low mountains from 1000 to 2000 feet high. They are old and worn down, and contain considerable quantities of gold, silver, lead, and copper. One of the country's chief seaports, Adelaide, is on the southern margin of this region.

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MAP STUDIES

1. What people helped in the early exploration of the Australian coast? 2. Why was it difficult to reach the interior of this continent? 3. How should you plan to cross the continent from east to west to-day? from south to north?

4. If there were no need of considering the expense, what would be the best way to explore the interior of this continent to-day? 5. Where do the largest rivers in Australia rise? 6. Why are there no large rivers in the central or western part of Australia? *See map on page 265.*

7. How much of Australia is in the torrid zone? 8. In what zone is the rest of the continent? 9. Is any part of Australia or New Zealand farther from the equator than the Cape of Good Hope?

10. What large city in Australia is in about the same latitude as the Cape of Good Hope and Mt. Aconcagua? 11. What mountain in Japan is about as far east from Greenwich as the highest mountain in New Guinea?

12. Judging from the surface features and latitude of Australia, where should you expect to find the greatest rainfall? Look at the map on page 265 to see if your answer is correct.

13. How high is Mt. Kosciusko? 14. What is another name that we might use in place of "Great Australian Bight"? 15. Make a list of the natural regions in the Commonwealth of Australia, and fix in memory the location of each one.

16. Judging from this map, what part of Australia should you expect to be most densely populated? Check your answer by studying the map on page 265. 17. What do you need to know in addition to the form of the land before you can decide where most of the people will live?

Home work. 1. On an outline map of Australia and New Zealand locate Sydney, Melbourne, Perth, and Auckland.

2. Add to your map (1) a navigable river, (2) the transcontinental railroad, (3) the capital of Australia, and (4) the capital of New Zealand. 3. Learn the political divisions of Australia and the location of each.

Fig. 518. These men are foreign buyers sampling wool in a warehouse at Sydney. The wool is sold at auction, and by sampling it beforehand each buyer can decide how much he wishes to bid for it. What nations do you think these buyers represent? Where is most of the wool manufactured?

Fig. 517. This is a typical herd of dairy cattle such as may be seen in southern Australia and New Zealand. Dairying is one of New Zealand's most important industries, and almost the whole output of butter and cheese goes to England. What are the other great dairying countries of the world?

The **Western Plateau**, from 1000 to 2000 feet above sea level, is for the most part a vast desert. The northern coast receives plenty of rain, and the southwestern corner receives enough rainfall for agriculture, but the central and more western part is an exceedingly dry place. There is not a stream or a rivulet in this vast area. No man should ever venture to cross such a desert without a complete caravan outfit. The heat is so intense that the rocks and the ground become too hot to touch with comfort. Worse than the heat and dryness are the numerous blood-sucking insects in this region.

The explanation of the Australian desert is the same as that for the desert in South Africa. The prevailing winds are the southeast trades, which, when they reach this region, have already given up most of their moisture on the East Australian Highlands. Unless intercepted by a mountain range, trade winds are always drying winds, since in flowing toward the equator they grow warmer and absorb moisture instead of giving it up. In the extreme north the monsoon winds bring very heavy rains in summer.

In places in the western portion of the plateau gold is abundant, but water is very difficult to get at the mining camps. **Kalgoorlie** is in one of the richest gold fields in the world. *See map on page 260.* It lies 400 miles from the sea, and the supply of water comes from a huge reservoir near Perth. The water is pumped to the summit of the tableland and carried more than 300 miles in pipes. In some places camels are used to carry water to the mines.

In 1918 the first transcontinental railroad in Australia was completed. *See map on page 260.* It crosses the southern portion of the desert and will make trade possible over an inland route between the eastern and western centers of population. This railroad passes through the Kalgoorlie gold-mining district and should greatly help in the promotion of mining.

AUSTRALIA
AND ISLANDS OF THE PACIFIC
POLITICAL AND ECONOMIC MAP
Scale of statute miles on the Equator
0 100 200 400 600 800 1000 1200
Scale of kilometers on the Equator
0 200 400 600 1000 1500 2000
Capitals of dominions
Capitals of minor divisions
Chief seaports
Principal railroads
Navigable rivers
Lowlands
Old, worn-down mountains
Plateaus
Young, rugged mountains
Longitude East from Greenwich
110° Hongkong
120° Manila
130°
140° Yokohama
150°
160°
170°
180°
Equator
Tropic of Capricorn
INDIAN OCEAN
PACIFIC OCEAN
CORAL SEA
TASMAN SEA
BORNEO
CELEBES
DUTCH EAST INDIES
JAVA SEA
BANDA SEA
ARAFURA SEA
TIMOR SEA
NEW GUINEA
SOLOMON ISLANDS
NEW HEBRIDES
NEW CALEDONIA
FIJI ISLANDS
NORTHERN TERRITORY
WESTERN AUSTRALIA
QUEENSLAND
NEW SOUTH WALES
VICTORIA
TASMANIA
NORTH ISLAND
SOUTH ISLAND
NEW ZEALAND
Great Sandy Desert
Great Victoria Desert
Great Australian Bight
Shellborough
Port Hedland
Onslow
North West Cape
Carnarvon
Geraldton
Perth
Fremantle
Bunbury
Albany
Esperance
Eucla
Kalgoorlie
Coolgardie
Laverton
Darwin
Port Darwin
Pine Creek
Wyndham
Kimberley Division
Broome
Derby
Fitzroy R.
Roebourne
Nullagine
Alice Springs
Aritunga
Macdonnell Range
Ayers Rock
Oodnadatta
Cloncurry
Mt. Isa
Normanton
Croydon
Cairns
Townsville
Mackay
Rockhampton
Gladstone
Brisbane
Toowoomba
Maryborough
Bundaberg
Great Sandy I.
Fraser I.
Byron
Grafton
Armidale
Newcastle
Sydney
Parramatta
Wollongong
Goulburn
Canberra
Federal District
Mt. Kosciusko
Albury
Wagga Wagga
Deniliquin
Echuca
Bendigo
Ballarat
Melbourne
Bairnsdale
Geelong
Portland
Warrnambool
Mt. Gambier
Adelaide
Kangaroo I.
Spencer Gulf
Gulf St. Vincent
Port Augusta
Port Pirie
Whyalla
Broken Hill
Wentworth
Mildura
Swan Hill
Murray R.
Darling R.
Lachlan R.
Murrumbidgee R.
Cobar
Dubbo
Orange
Bathurst
Lithgow
Port Macquarie
Coffs Harbour
Lismore
Murwillumbah
Tweed Heads
Grafton
Moree
Narrabri
Gunnedah
Tamworth
Scone
Muswellbrook
Singleton
Maitland
Cessnock
Gosford
Wyong
Terrigal
Woy Woy
Hornsby
Manly
Bondi
Kogarah
Sutherland
Wollongong
Nowra
Ulladulla
Batemans Bay
Moruya
Eden
Merimbula
Bega
Cooma
Tumut
Gundagai
Yass
Goulburn
Crookwell
Young
Cowra
Forbes
Parkes
Condobolin
Lake Cargelligo
Hay
Balranald
Swan Hill
Kerang
Echuca
Shepparton
Wangaratta
Benalla
Seymour
Kilmore
Broadford
Whittlesea
Healesville
Lilydale
Ringwood
Dandenong
Frankston
Mornington
Sorrento
Queenscliff
Geelong
Colac
Hamilton
Portland
Warrnambool
Port Fairy
Mt. Gambier
Naracoorte
Millicent
Robe
Kingston
Victor Harbor
Port Elliot
Goolwa
Murray Bridge
Renmark
Loxton
Berri
Waikerie
Barmera
Port Pirie
Whyalla
Port Lincoln
Ceduna
Eyre Peninsula
Nullarbor Plain
Eucla
Esperance
Albany
Busselton
Bunbury
Mandurah
Rockingham
Fremantle
Perth
Northam
York
Toodyay
Wongan Hills
Moora
Geraldton
Carnarvon
Exmouth
Onslow
Roebourne
Port Hedland
Broome
Derby
Wyndham
Kununurra
Ord River
Lake Argyle
Victoria River Downs
Tennant Creek
Alice Springs
Ayers Rock
Uluru National Park
Kata Tjuta
Mt. Olga
Mt. Conner
Lake Eyre
Lake Torrens
Lake Gairdner
Lake Frome
Lake Callabonna
Lake Eyre South
Lake Eyre North
Birdsville
Innamincka
Cooper Creek
Thargomindah
Cunnamulla
Charleville
Roma
Dalby
Toowoomba
Ipswich
Brisbane
Gold Coast
Tweed Heads
Byron Bay
Coffs Harbour
Port Macquarie
Taree
Forster
Newcastle
Maitland
Singleton
Muswellbrook
Scone
Tamworth
Gunnedah
Narrabri
Moree
Inverell
Glen Innes
Armidale
Grafton
Lismore
Murwillumbah
Tweed Heads
Gold Coast
Brisbane
Ipswich
Toowoomba
Dalby
Roma
Charleville
Cunnamulla
Thargomindah
Birdsville
Innamincka
Cooper Creek
Lake Eyre
Lake Frome
Lake Callabonna
Lake Torrens
Lake Gairdner
Eyre Peninsula
Nullarbor Plain
Eucla
Esperance
Albany
Busselton
Bunbury
Mandurah
Rockingham
Fremantle
Perth
Northam
York
Toodyay
Wongan Hills
Moora
Geraldton
Carnarvon
Exmouth
Onslow
Roebourne
Port Hedland
Broome
Derby
Wyndham
Kununurra
Ord River
Lake Argyle
Victoria River Downs
Tennant Creek
Alice Springs
Ayers Rock
Uluru National Park
Kata Tjuta
Mt. Olga
Mt. Conner
Lake Eyre

MAP STUDIES

1. What are the chief mineral resources of Australia? 2. Are they found in the mountains, the plateau, or the lowlands? 3. To what countries are the minerals exported?

4. What part of the United States imports coal from Australia? To what other countries is Australian coal exported? 5. Where are the sheep raised in Australia? in New Zealand? 6. Why are there so few settlements in the interior of Australia?

7. Judging from exports, what do you think must be the occupations of most of the people in New Zealand? 8. What are the chief seaports of Australia and New Zealand? 9. Where are the best places for raising fruits in Australia? 10. What rivers in Australia are navigable?

11. If you were going to New Zealand or Australia, over what route should you plan to travel? 12. What lines of business in Australia may attract American young men?

13. Where should you go within the area shown on this map to see men gathering nutmegs? gathering coconuts? preparing crude rubber for shipment? raising sugar cane? fishing for pearls? 14. What products are shipped from the Dutch East Indies to the different countries of Europe?

Fig. 519. The thinner hillside soils of southern Australia support extensive orchards. Apples are the chief product, but many other fruits thrive equally well. In some parts of Australia lemons and oranges grow side by side with cherries, plums, peaches, and other stone fruits. How do you explain this unusual fact?

15. In what other parts of the world are products like those shipped from the Dutch East Indies raised? 16. Name the countries with which most of the foreign trade of New Zealand is carried on.

17. What nations have possessions within the area shown on this map? 18. What is the capital of Queensland? of New South Wales? of Victoria? of Tasmania? of South Australia? of Western Australia? of New Zealand?

19. Where is Canberra, the new Federal District of Australia? The capital of the Commonwealth of Australia will some day be moved to this place. What other portions of the Commonwealth of Australia are organized as territories?

20. What three progressive cities, one of which is in South Africa, one in New South Wales, and one in Chile, are in about the same latitude south of the equator? 21. In what large city in Japan is it noon at about the same time that it is noon at the capital of South Australia?

22. Is Manila or the capital of Western Australia the farther east from Greenwich? 23. Is any part of the area on this map in what is called west longitude, that is, less than 180 degrees west from Greenwich?

24. The blue arrows in Western Australia follow the lines of ancient rivers. That part of the continent, where there is now a desert, must have had an abundance of rain a long time ago. The rivers flowed from one lake to another and finally reached the sea. 25. Locate the little island of Nauru. Large quantities of phosphate are obtained there.

Home work. 1. Make a list of the chief exports to the United States. 2. Prepare a list of the food supplies shipped from Australia to other countries. 3. Make a list of products shipped from Australia that are used in manufacturing industries. 4. What are the three leading imports of Australia? 5. Read in some book of reference about the rabbits of Australia and about the kangaroo.

Fig. 520. Sydney, the chief port of Australia, has a broad, deep harbor, with 25 miles of docks where even the largest vessels can anchor. This is the Circular Quay, one of the busiest wharves of Sydney. Why do these great ships come to Sydney? What are the other ports of Australia?

Coastal plains. In several places about the margin of the continent there are narrow coastal plains. In New South Wales the coastal lowland is a well-watered, fertile region, where subtropical fruits and vegetables are raised (Fig. 519). The Valley of Victoria is also well watered and very productive.

In the southwest corner of the continent, where the prevailing westerly winds bring rain during the southern winter season, there is a lowland suitable for agriculture and settlement. There fruits and vegetables are raised. From Perth, the principal seaport of this district, gold from the western desert and wood from the neighboring forests are shipped to Europe.

On the northeast, off the coast of Queensland, is the **Great Barrier Reef.** This is the longest coral reef in the world. It is 1200 miles in length and has been built up by corals on the very edge of the eastern continental shelf. *See map opposite page 265.* The channel between the reef and the mainland is 400 feet deep and in places about 70 miles wide.

Fig. 521. These Maori girls do not need stoves to cook their food. They live on North Island, New Zealand, where there are geysers, hot springs, and boiling pools. At any time they can put their pots and kettles over the steaming cracks and cook all they wish

New Guinea. A portion of New Guinea (the Territory of Papua) belongs to the Commonwealth of Australia. Like most of the islands between Australia and Asia, New Guinea is mountainous, and the mountains are young and rugged. So far the interior has not been explored on foot, but recently airplanes have been used in the examination and mapping of the island.

Since New Guinea is so near the equator, the climate is very hot and the rainfall is heavy. The narrow lowlands near the coast, and also the mountain slopes up to a height of 6000 feet, are covered with forests. On the slopes above the forests there are grasslands.

The island is rich in minerals, but as yet little mining has been done. Plantations of sugar cane and rubber trees have been introduced, and the vanilla bean is also raised. Such industries are under the direction of Europeans, but labor is scarce and it is difficult to get work done.

The western half of New Guinea belongs to the Dutch, and the northern part of the eastern half was formerly a German possession. It is now under the control of Australia. The native people of the island, who make up most of the population, are Papuans.

Tasmania is also part of the Commonwealth of Australia. This island is the southern continuation of the eastern highlands. It is mountainous, and in the mountains there are rich deposits of coal, tin, silver, and other minerals. Sheep-raising is the chief industry of the uplands. In the fertile valleys fruit is raised, and Tasmanian apples are famous for their flavor.

Cities. **Sydney**, the oldest town in Australia, is the capital of New South Wales and its chief seaport (Fig. 520). It has an excellent harbor and the supplies of coal and iron close by have greatly increased its importance.

Melbourne is the capital of Victoria and one of the principal seaports. This city has become an important manufacturing and railroad center. The country about Melbourne produces the finest merino wool in the world. Melbourne is the city from which the great butter exports of Australia are sent to New York.

Brisbane is the capital and chief port of Queensland. It is 25 miles from the coast at the head of navigation on a small river. This city is near certain of the great supplies of coal and gold; railroads on the north and south connect it with other important centers.

Adelaide, the capital of South Australia, is nearer Europe than the other eastern capitals and has a large export and import trade.

Perth is the capital of Western Australia and the port of export for the gold of the state.

Government. The Commonwealth of Australia consists of six states: New South Wales, Victoria, Queensland, South Australia, Western Australia, and Tasmania. The Territory of Papua is a dependency of Australia.

In the Commonwealth there is a Federal Parliament consisting of a Governor-General, who represents the king, a Senate, and a House of Representatives. Each of the states elects six senators for terms of six years. The number of representatives depends, as in the United States, upon the population in each state. They are chosen for three years. Equal suffrage prevails in Australia.

Problems and review questions. 1. Name the four chief natural regions of Australia. 2. What mountains in North America do you think may be like the eastern and southern highlands? 3. Where did the rich soils of the Great Plains come from? 4. Why is most of Australia warm throughout the year? 5. What breed of sheep furnishes the finest grade of wool? 6. Of what value is the saltbush? 7. Why is it dangerous to cross a great desert? 8. Of what empire is Australia a part?

Fig. 522. Here is a group of native Maori men in front of one of their curious carved houses. They are dressed for a war dance. Fifty years ago the Maoris were cannibals, but since the coming of the English to New Zealand they have become civilized citizens of the British Empire

NEW ZEALAND

New Zealand consists of North Island, South Island, and Stewart Island. Together with a number of the smaller islands in the Pacific Ocean, they form a British possession known as the Dominion of New Zealand. Most of the inhabitants are English-speaking people.

Physical features. The islands are mountainous, with small lowland areas in a few places near the coast. In North Island many of the mountains are active or extinct volcanoes, and in that region there are geysers and hot springs like those in Iceland and Yellowstone National Park (Fig. 521). In South Island are the beautiful Southern Alps, which rise to a height of over 12,000 feet. There the scenery is magnificent. There are glaciers, swift mountain streams, and waterfalls. On the western coast are long, winding fiords as beautiful and remarkable as many of the fiords of Norway; these fiords were once filled with glaciers.

Climate. Since the mountains are so high and these islands are in the belt of the prevailing westerly winds, the rains fall chiefly on the western slope. When the winds descend on the east, they tend to dry up the country, though not enough to make it a desert. This is another case of a mountain range with a wet windward slope and a dry leeward side. At the weather station of New Zealand which reports the least rainfall there is usually about 23 inches in the year, while in the mountain areas the rainfall amounts to as much as 200 inches during some years.

Except in the high mountains the temperature in New Zealand is mild and without great changes from summer to winter.

Native people. Hundreds of years ago a group of people, known as the Maoris, who were tall, handsome, brown-skinned people (Fig. 522), came to New Zealand in great canoes. They probably came from other islands in the Pacific Ocean, and, being pleased with this land, they decided to stay. Many of the natives have now become civilized and are well educated. They are allowed a representative in the government.

Fig. 524. Auckland is one of the leading seaports of New Zealand. Like Sydney it has an excellent harbor, and the largest ships can anchor at its wharves. With what countries does New Zealand chiefly trade? Can you find any points of likeness between New Zealand and the British Isles?

Pasture lands. New Zealand is a pasture land. When you look at the map (p. 260), notice that some product from the sheep is being exported from each of the large seaports. The sheep have no natural enemies on these islands, and it is not necessary to have the flocks watched day and night, as in our western mountains, where there are bears, mountain lions, and coyotes.

The eastern side of the islands was overgrown by coarse, wiry native grasses, but little by little the British people who have settled there have plowed up the land and sown the seeds of better grasses.

Fig. 523. New Zealand is especially well fitted for the raising of cereals, and there is not one variety which will not grow in some part of the islands. This is a harvest scene on South Island. New Zealand cannot compete with Canada, the United States, Argentina, or Russia in supplying the European grain market. Can you explain why?

Cities. The chief cities are **Auckland** and **Wellington**, which have the best harbors. Auckland is the largest city (Fig. 524), but Wellington is the seat of government. Both are up-to-date cities with all modern conveniences. **Christchurch**, on South Island, is the third city in size.

The outlook. Gold, coal, and some silver have been found in the mountains, but as yet mining is not much developed. Some day, when there are more people living in New Zealand, manufacturing industries will

Fig. 525. North of Australia, in the tropical seas, are hundreds of volcanic islands. This is Gunong Api, which means "fire mountain." It is an active volcano, rising straight out of the sea as an almost perfect cone. During the last three centuries Api has erupted many times, causing terrible destruction

undoubtedly be developed. Most of the people live near the coast, and with their available water-power, and with good supplies of coal, timber, wool, and hides, electrical plants and such industries as shipbuilding and the manufacture of woolen and leather goods may easily be developed.

PACIFIC ISLANDS

We have considered the Aleutian, Hawaiian, Japanese, and Philippine Islands, the Dutch East Indies, New Zealand, and many other islands in the Pacific, and still there are hundreds of islands in this ocean that we have not mentioned. Most of them are the forested tops of volcanic peaks (Fig. 525). Many are surrounded by fringing or barrier reefs built by corals (Fig. 526), and some have been made entirely by corals. A fringing reef is built at the coast line, but a barrier reef is far enough out to sea to leave a lagoon between the mainland and the coral reef. *See map opposite page 265.* Some of the islands that are made entirely of coral are circular in form, and in the center of the circle there is a lagoon of shallow water. Such coral islands are called *atolls*.

The volcanic islands have the richer soils, and sugar and tropical fruits are raised there. The coconut palm is abundant on these islands and is very widespread, for the coconut, when washed into the sea, will float for a long time and may drift to some distant island and there start a new tree.

Most of the natives of these islands belong to the brown race. They are good fishermen and clever sailors. Of late years many Chinese and Japanese have gone to the small islands of the Pacific to work on plantations.

Great Britain, France, Japan, and the United States are the countries chiefly interested in these islands.

Problems and review questions. 1. Of what nation is New Zealand a part? 2. What prevailing winds come to these islands? 3. In what part of New Zealand is the rainfall greatest? 4. In what part of New Zealand is the rainfall least? 5. What is the chief occupation of the people? 6. What are the chief exports? 7. How far is New Zealand from Australia?

8. What three countries in the world have geysers? 9. Explain the presence of glaciers in New Zealand. 10. What resources in these islands encourage settlers to go there? 11. Why is New Zealand a good country in which to raise sheep? 12. What industry may be developed?

13. Name the two largest cities of New Zealand. 14. What is the explanation of many of the small islands in the Pacific Ocean? 15. Why are coconut palms abundant on these islands? 16. Of what value are the island possessions to the great nations of the world?

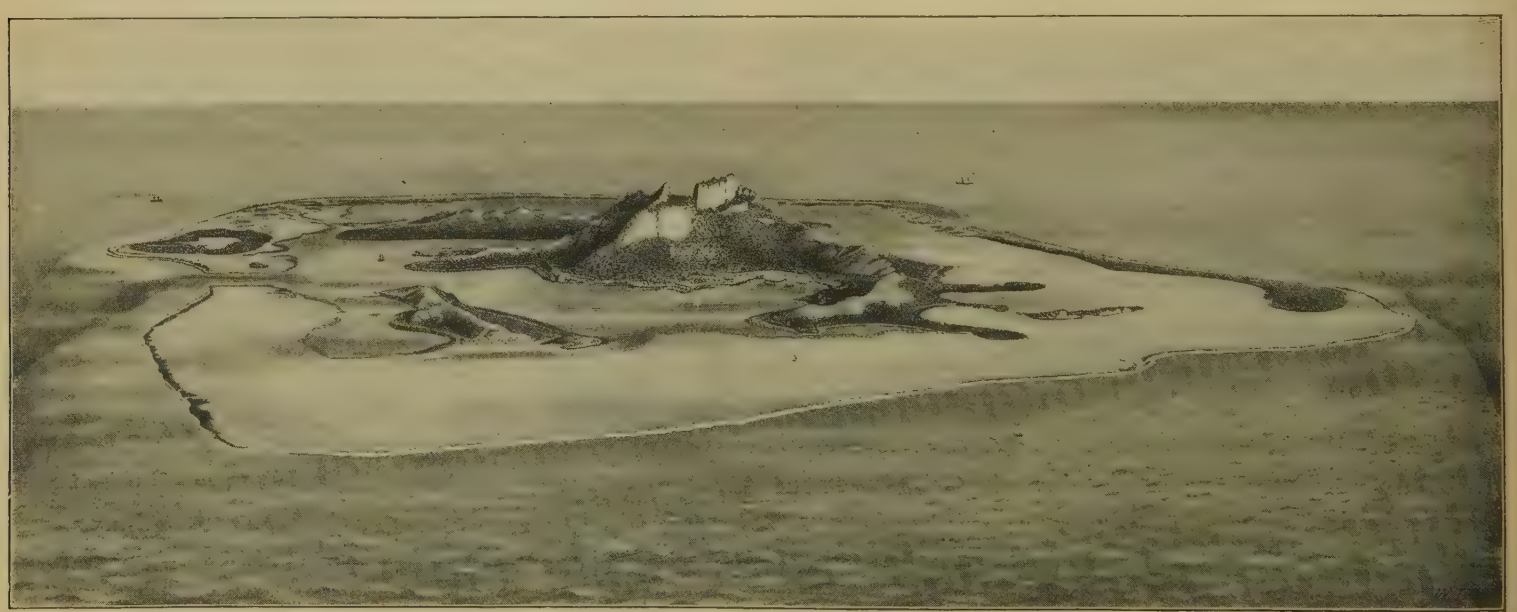


Fig. 526. This island is the top of an old volcanic peak. It is partly forested, but here and there the bare volcanic rock stands out in steep cliffs. The slopes of the volcano have been cut away by the waves, leaving the top resting on a platform covered by shallow water. The steep sides of the volcano drop abruptly to the depths of the ocean. On the outer rim of the platform the corals have built a fringing reef, which is broken only in one place (at the left). This is the only passage by which ships may enter the lagoon and reach the small village which is on the inner island

Photograph by Donald MacMillan — Courtesy of the American Museum of Natural History

Fig. 527. This is a picture of the MacMillan exploring party on the ice near Etah, Greenland. Locate Etah on the map on the opposite page. Trace MacMillan's route of exploration. Can you describe the type of country which he found in crossing Ellesmere Island? Why did he travel by dog team?

Courtesy of Lee Keedick, New York

Fig. 528. This picture shows Amundsen, the discoverer of the south pole, on the ice in Ross Sea. When did Amundsen reach the south pole? How long was that after Peary discovered the north pole? If explorers were planning to visit Ross Sea, from what port would they probably sail?

POLAR REGIONS

NORTH POLAR REGION

At the north pole there is a shallow ocean, and the water becomes so cold that in winter it is frozen over. Salt water does not freeze at 32 degrees Fahrenheit, but there the temperature of the ocean waters falls to 30 or even to 29 degrees and then freezes.

During the summer the ice is broken into great cakes that float about, and when these floating masses strike against each other, the ice is crushed and piled up in ridges ten, twenty, and even fifty feet high (Fig. 527).

MAP STUDIES

1. Through what countries does the arctic circle pass? 2. What ocean is within that circle? 3. Name four of the larger islands in the north polar region. 4. Name a large river that empties into the Arctic Ocean and there forms a delta.

5. Through what body of water may a vessel pass from the Pacific Ocean to the Arctic Ocean? 6. This map represents summer conditions. How different should a winter map appear? 7. In what countries bordering the Arctic Ocean are there tundras?

8. About how far is it in miles from the arctic circle to the north pole? 9. How far is it from the north shore of Grant Land to the north pole? 10. When and by whom was the north pole first reached? 11. Name five men who have led exploring expeditions into the arctic zone.

12. What explorer left Norway, followed the north coast of Russia and Siberia, and from New Siberia started northward but failed to reach the pole? 13. What explorer left Norway and followed the north coast of Russia and Siberia and then passed through Bering Strait into the Pacific Ocean?

14. The northernmost permanent settlement in the world is shown. It is an eskimo settlement. Give its latitude.

SOUTH POLAR REGION

At the south pole there is a continent larger than Australia and nearly as large as South America. Most of this great land mass is covered with ice, as the northern part of North America and the northwestern part of Europe were during the Glacial Period.

The Antarctic ice-sheet moves slowly toward the sea, and there large blocks of ice break off and float away.

The north pole is at sea level, but at the south pole the elevation is 10,500 feet above the sea.

MAP STUDIES

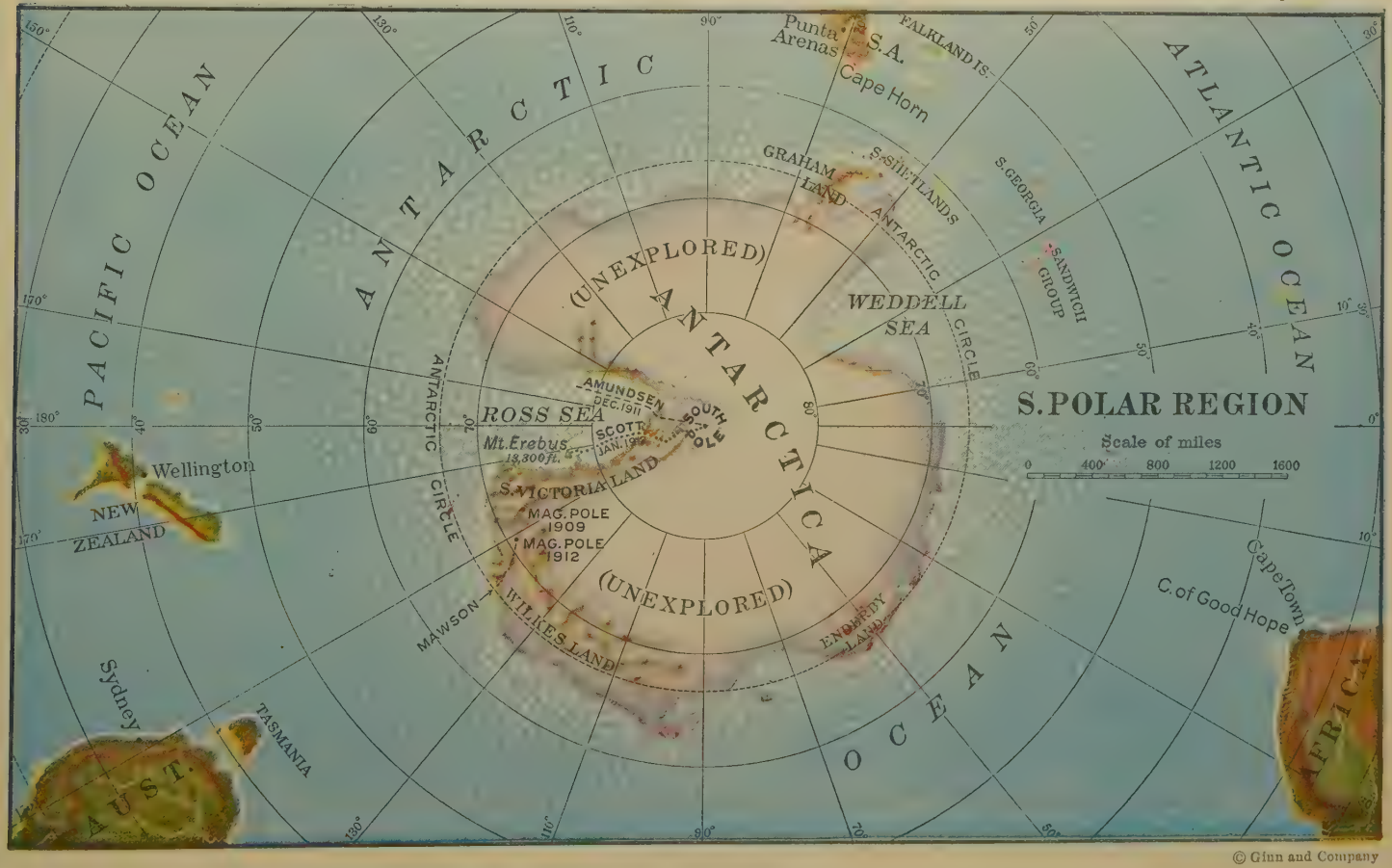
1. Compare the scale of this map with that of the north polar region. 2. About how far is it in miles from the antartic circle to the south pole? 3. What other continent comes nearest to Antarctica?

4. How far is it in miles from Cape Horn to Graham Land? 5. How far is it from Cape Horn to the south pole? 6. What ocean surrounds Antarctica? 7. What is the greatest diameter of the ice-sheet which covers this southern continent?

8. If one edge of that ice-sheet were placed in New York City, how far west would that mass of ice extend? 9. Who located the south magnetic pole in 1912? He found it in a different place from where it was in 1909. Both the north and south magnetic poles change position from time to time.

10. What two famous explorers reached the south pole? 11. This map represents summer conditions. How different should a winter map appear? 12. There are no people living on the continent of Antarctica.

13. The southernmost city in the world is shown. Give its name and latitude. How much farther is it from the south pole than Etah is from the north pole? 14. Contrast the conditions at the north and south poles.



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WORLD GEOGRAPHY

We have studied all the great continents of the world, and this has required some study of each of the oceans. Little by little our information regarding the earth has increased. The time has come for us to consider some larger questions. We may now see how widely geographic conditions have influenced the life and occupations of the people.

The most interesting way to approach the study of the earth as a whole is through the history of the ideas which people have had regarding the earth.

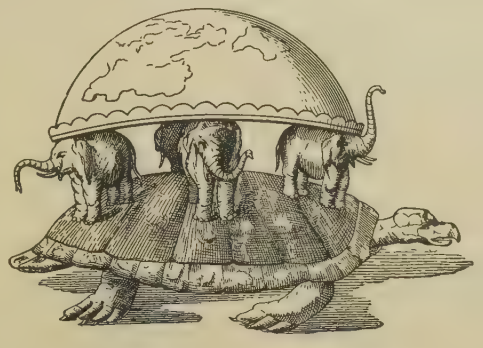

Fig. 529. The early Hindus represented the earth as a hemisphere upheld by four elephants standing on the back of an immense tortoise. The tortoise was said to be floating on the surface of a universal sea, and the elephants were symbolical of the four winds

Early ideas of the world. The peoples who developed the remarkable civilizations about the shores of the eastern Mediterranean long before the birth of Christ knew little about distant lands. Many thought the earth was flat, and that if one traveled far enough he would find a great flowing stream called the ocean. They believed the ocean encircled the earth, and that if one went beyond its edge he would fall off. *See small inset maps on Plate A in Appendix.*

The celebrated Greeks Homer, Herodotus, and Aristotle, and, later, Ptolemy the Egyptian, became very much interested in the shape and size of the earth. The astronomers of those early times reasoned, quite correctly, that since the North Star appears to rise when one travels northward, and to fall if one goes to the south, the earth must have a curved surface. A degree of latitude was measured on the earth's surface. Ptolemy, who believed that the earth was spherical, figured out what he thought its size must be. Most people were unwilling, however, to believe that the earth was round, and hundreds of years passed before its true shape was known.

Early geographic explorations. The desire to open up trade with people in other lands led to many exploring expeditions. In the Far East were the Chinese and Japanese, whose explorers pushed westward into Asia and eastward along the islands in the north Pacific toward America. There were very intelligent native people living in Mexico and Peru who gained some knowledge of both North and South America. Among the Pacific islands the more adventurous tribes found their way from one group of islands to another. The nations of western Europe sent out expeditions which were remarkably successful, and the people from those nations have come to control most of the lands in the temperate zones, except that portion which is in eastern Asia.

The journeys of Marco Polo in Asia, and of the Arabs who followed the shores of the Indian Ocean, aroused a new interest in geography; and when the caravan routes to the East were closed by the Turks (p. 176), and European merchants were deprived of the goods brought overland, the desire for a new route to India became intense. In 1492 Columbus made his famous voyage, in the belief that India could be reached by sailing westward from Spain. When Columbus set sail, few people believed that the earth was round, and, indeed, this belief did not become general until Magellan had made his voyage around the earth.

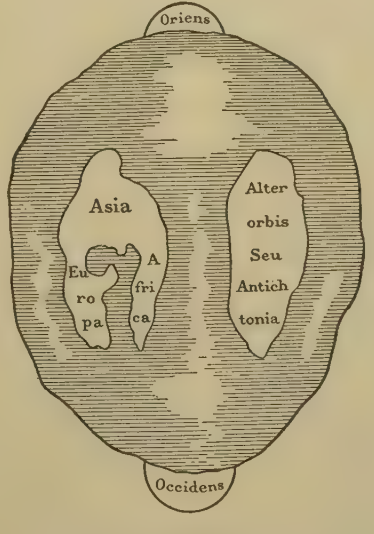

Fig. 530. This is Marco Polo's map of the earth. Notice that the east (Oriens) is at the top of the map and the west (Occidens) is at the bottom. Notice also that Europe, Asia, and Africa (the known world of Marco Polo's time) are represented as forming one continent in the northern hemisphere, and that the southern hemisphere was supposed to contain another world (alter orbis) or (seu) Antichtonia. The name "Antichtonia" comes from two Greek words meaning *an opposite world*

It should be remembered that several hundred years before Columbus was born, Eric the Red, a daring Norseman, had sailed westward to Iceland, and later had reached Greenland and points on the continent of North America. The rest of the world, however, knew nothing of his voyages until centuries later, and the discoveries of the Norseman therefore had little influence on later exploration.

Home work. Read an account of Marco Polo's journey through central Asia.

Later explorations. After Columbus's voyage, further discoveries followed fast. The Portuguese, Spanish, English, and French all sent out expeditions. The main outlines of the continents soon came to be known, and the settlement of the Western Hemisphere progressed rapidly. In the middle and latter part of the last century Stanley and Livingstone undertook the exploration of the interior of Africa,

which, being unknown, was so long called the Dark Continent, and Nordenskjöld sailed from the Atlantic to the Pacific Ocean along the north coast of Europe and Asia. Later Nansen followed the Nordenskjöld route as far as New Siberia and then turned northward and tried to reach the north pole, but failed. More recently the remarkable journeys of Peary, Amundsen, and Scott in the polar regions have been made. *See maps opposite page 266.*

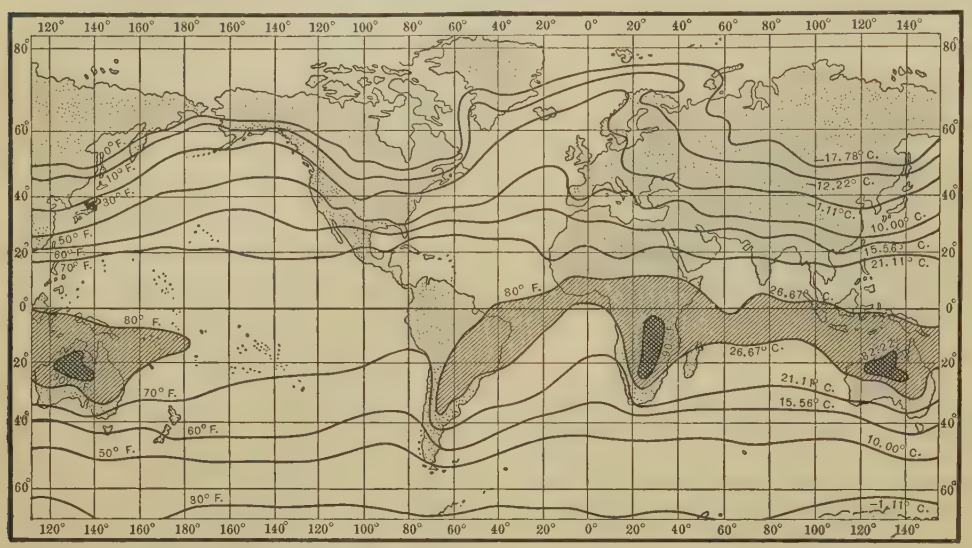

Fig. 531. The heavy lines with figures near them connect places where the average temperatures are the same in January. Where are the hottest places? Is the belt where the temperature is 80° F. or above mostly north or south of the equator? Why? Why do the temperature lines curve northward west of Europe and west of South America? ***See also ocean map on page 275***

Shape and size of the earth. We now know that the diameter of the earth is nearly 8000 miles and that the circumference at the equator is about 25,000 miles. The way a ship disappears below the horizon at sea proves that the earth has a curved surface, and the shadow of the earth on the moon is always part of a circle and proves that the earth must be spherical.

The earth is not a perfect sphere, for in the polar regions the surface is somewhat flattened. The distance through the earth from pole to pole is 27 miles less than it is through the earth at the equator.

Directions. Early explorers knew that they could determine the directions at night, in the northern hemisphere, by an observation of the North Star. During the day they could tell what direction was north by the shadow of the sun at noon. Later they learned to use the compass. Sea captains and all explorers and surveyors must understand the reading of a compass perfectly.

Early explanation of days and nights. When it was believed that the earth was flat, some explanation had to be given for the sun's rising and setting each day. Among the ancient Roman myths is the story of Phœbus Apollo, who each morning brought the golden chariot of the sun around to the east, and carefully guided his fiery steeds across the skies during the day. There are many other myths or legends to explain the coming of the day.

Problems and review questions. 1. Have you ever noticed anything that made you believe that the earth's surface is curved? 2. What objection is there to believing that it is flat? 3. Why did men start off on exploring expeditions?

4. Who were some of the early explorers? Where did they go? 5. What nations were especially active in exploring the distant parts of the world? 6. About how long is the diameter of the earth? 7. What is the circumference at the equator?

8. What means have we in this country for determining the direction north on a clear night? What means may be used during the day? 9. What was the earliest explanation of the rising and setting of the sun each day? 10. What is the highest temperature shown on the maps, Figs. 531 and 532? What is that temperature in Fahrenheit and in centigrade degrees? The Fahrenheit figures will be found on the temperature lines at the western side of the maps; the centigrade figures will be found at the eastern side of the maps.

11. What is the lowest temperature shown on these maps? What is it in Fahrenheit and in centigrade degrees? 12. If the degree marks were erased from your thermometer, how could you fix and mark accurately the freezing and boiling points again?

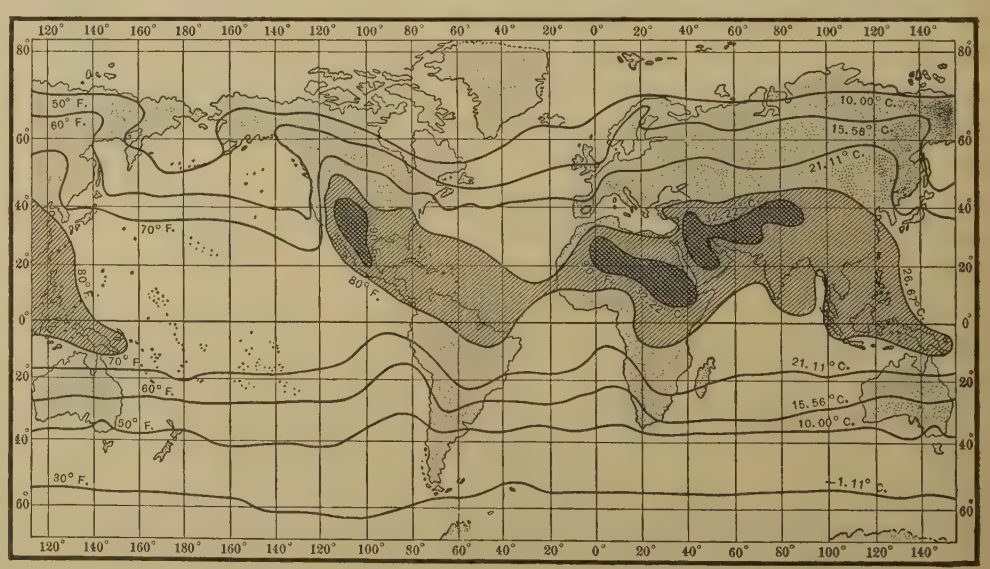

Fig. 532. The temperature lines on this map and on the map in Fig. 531 are called *isotherms*. This map gives the average July temperatures. Where are the hottest places? Is the belt where the temperature is 80° F. or over mostly north or south of the equator? Why has this belt shifted from where it was in January? Why have the centers of greatest heat shifted?

Rotation of the earth. We now know that the earth is round and is turning on its axis, and so we have a very different explanation of days and nights. Hundreds of years passed before anyone proved that the earth turned on its axis. The fact that the earth moves at all has been one of the hardest things for men to believe. Nothing seems so natural as to think that the earth stands still and that other heavenly bodies do the moving.

Galileo, who was a wonderful scientist, dropped weights from near the top of the leaning tower of Pisa in Italy. He knew that if the earth stood still, the object dropped would follow the plumb line directly toward the center of the earth. He found, however, after many experiments, that the objects he dropped struck the earth east of the point where the plumb line met the earth.

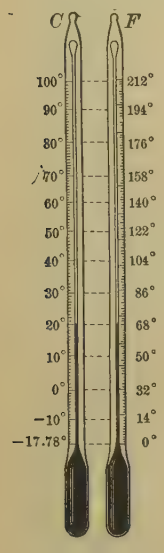

Fig. 533. What are the freezing and boiling points on the centigrade and Fahrenheit thermometers?

This proved not only that the earth was rotating, but that it rotated from west to east, for it could not have happened unless the top of the building had moved forward, or eastward, faster than its base, just as the rim end of a spoke in a moving wheel moves faster than the hub end. The weight, while falling, had kept its forward motion as a person does in stepping from a moving car.

Revolution and inclined axis. Much later came the discovery that while the earth is rotating on its axis every twenty-four hours, it is going on a long journey around the sun (Fig. 538). This takes a year to accomplish. It was also discovered that the axis of the earth, the imaginary line on which it rotates, is not vertical but is tipped $23\frac{1}{2}$ degrees to the plane of its orbit (Fig. 539). The orbit of the earth is its path around the sun (Fig. 538).

The amount of inclination of the axis is shown by the fact that on one day of the year, June 21, the rays of the sun go $23\frac{1}{2}$ degrees beyond the north pole and fall $23\frac{1}{2}$ degrees short of the south pole. The positions of the arctic and antarctic circles are thus fixed. At that time the vertical rays of the sun strike $23\frac{1}{2}$ degrees north of the equator (Fig. 538). This fixes the position of the tropic of Cancer. On December 21, when the north pole is turned away from the sun, the vertical rays strike $23\frac{1}{2}$ degrees south of the equator. This fixes the position of the tropic of Capricorn. At that time the rays of the sun go $23\frac{1}{2}$ degrees beyond the south pole and fall $23\frac{1}{2}$ degrees short of reaching the north pole.

Home work. Make a series of diagrams showing where the rays of the sun strike the earth vertically on June 21, December 21, September 21, and March 21.

Latitude and longitude. Lines are drawn parallel to the equator on globes and on maps representing the earth, to show the degrees of latitude, or distance north and south of the equator (Fig. 534). Distance east or west on the earth is called longitude, and a number of half circles drawn from pole to pole and called meridians are used in measuring it (Fig. 535).

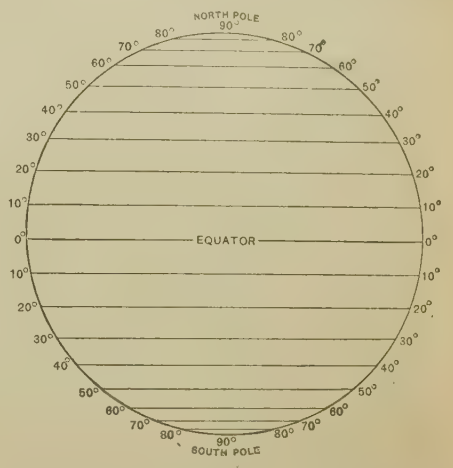

Fig. 534. The circles drawn on a globe parallel to the equator are called *parallels*. All the places on any one parallel are the same distance from the equator, or in the same latitude

English-speaking people usually begin to count degrees of longitude from the meridian that passes through Greenwich, England. Greenwich is just outside of London and is the site of a famous observatory (Fig. 330). If we call the meridian that passes through Greenwich the prime meridian, and number it 0, we can count 180 degrees east or west of Greenwich. *See Appendix, Plate A.*

Longitude and time. Each place on the earth in making one rotation passes through 360 degrees of longitude. Since we make one rotation in twenty-four hours, we pass through 15 degrees of longitude in one hour.

When the meridian on which we live passes under the sun, it is noon for us, and for people living 15 degrees west of us it is 11 A.M. One hour later their meridian will pass under the sun, and it will then be noon for them and 1 P.M. for us. Each 15 degrees of longitude between places on the earth means one hour's difference in time.

The people east of us see the sun before we do; therefore their time is later than ours. The time in the eastern part of the United States is always several hours later than that in the western part. When the armistice which stopped the fighting in the great World War went into effect, at 11 A.M. by Paris time, it was only 6 A.M. in Washington.

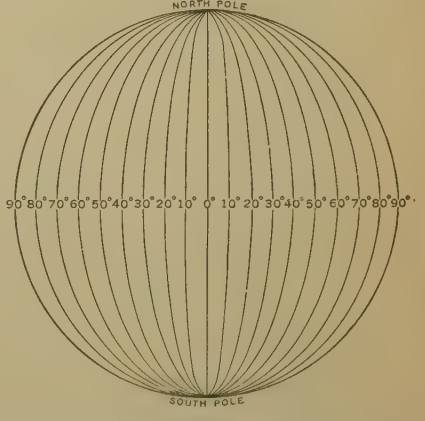

Fig. 535. All places on any of the north-and-south lines have midday at the same time. These lines are therefore called *meridians*, which means *midday lines*. Latitude and longitude are measured in degrees

Photograph by Donald MacMillan Courtesy of the American Museum of Natural History

Fig. 536. This is an unusual photograph of the midnight sun, taken near Etah, Greenland, in the month of July. The photographer exposed the plate every twenty minutes from 11 P.M. to 1.20 A.M., thus showing the path of the sun in the arctic region during the season when it is above the horizon night and day

Problems and review questions. 1. Do you believe that the earth turns on its axis? Why? How long does it take to make one rotation? 2. Why, at a given moment, is it later at Washington, D.C., than at San Francisco?

3. About how much difference in time is there between Paris and the city of Washington? 4. How do we know that the earth rotates from west to east on its axis? 5. How long does it take the earth to revolve about the sun?

Zones of latitude. Between the tropic of Cancer and the tropic of Capricorn is the torrid zone, extending $23\frac{1}{2}$ degrees north and south of the equator. North and south of that zone are the temperate zones, and around the poles are the north and south frigid zones.

Seasons and length of day and night. If the axis of the earth were upright, there would always be twelve hours of day and twelve hours of night everywhere on the earth except at the poles, where the sun would always appear at the horizon. Since the axis of the earth is inclined and the north pole is turned slightly toward the sun during a part of the year and away from it during another part (Fig. 538), the day and night are not of equal length in any place except at the equator. During the northern summer, when the sun's rays strike vertically north of the equator, the days are longer than the nights in the northern hemisphere. At that time the southern hemisphere is having winter, with short days and long nights. When winter comes to the northern hemisphere, the nights are longer than the days, while in the southern hemisphere the people are having summer, with long days and short nights (Fig. 538).

On the arctic circle there is a short period of each summer when the sun stays above the horizon for twenty-four hours. Those who live still nearer the north pole may see the sun above the horizon day and night for weeks or even months, and at the pole itself the sun stays above the horizon for six months. The same general facts hold for the region about the south pole during the southern summer. When winter comes within the arctic or antarctic circle, the days become shorter and shorter, and for a time the sun does not rise above the horizon. When the nights are long in one polar region, they are short in the other. The winter seasons in the frigid zones are so long and so severe that living conditions become very difficult.

Throughout the torrid zone the day and night do not differ much in length, and at the equator the day and night are always equal in length. This is because just half of the equator is in darkness all the time. The temperature in the torrid zone does not change much from season to season, and the hot, moist climate of that zone is weakening to all people.

In the temperate zones a few hours mark the difference between the length of the winter day and the length of the summer day. As the days in the north temperate zone become shorter those of the south temperate zone become longer. The changes in seasonal temperature are not so marked as they are in the Far North or in the Far South, but there is sufficient change to give great variety to the climate. That variety has been very beneficial in the development of civilized people; it has led them to build good homes and to store up food, clothing, and fuel for the winter. They have found it necessary to look ahead and provide for the cold season.

Angle of the sun's rays. The higher the sun is above the horizon, the more nearly vertical are the rays of heat and light. Oblique rays of heat must pass through more atmosphere, which takes out some heat, and they also spread over more surface than vertical rays (Fig. 537). Since a bundle of vertical rays warms a smaller area of the earth than an equal bundle of oblique rays, it warms that area more. This is one reason why the summer, when the sun's rays are nearly vertical overhead, is much warmer than the winter season.

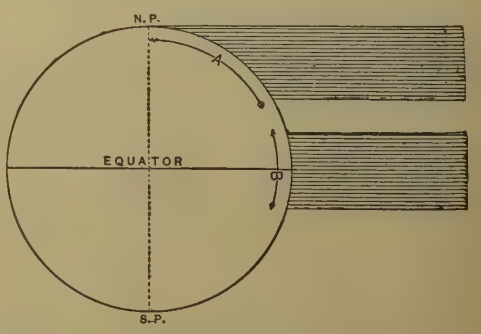

Fig. 537. Two equal bundles of the sun's rays are here shown striking different parts of the earth's surface. As many rays strike over the line B as over the line A. Where will the temperature be the higher, over A or over B? Why?

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Fig. 538. Seasonal changes in the position of the earth in relation to the sun

Problems and review questions. 1. Between what circles is the torrid zone? 2. What circles limit the temperate zones? 3. Where are the frigid zones? 4. Why are the days longer in summer than in winter at points north or south of the equator? 5. Where are the day and night always equal in length?

6. Describe the different seasons in the north polar region. 7. Why is it warm at sea level in the tropics throughout the year? 8. What difference have you observed in the temperature when the sun is high above the horizon and when it is low? 9. During what month at your home is the sun highest at noon? During what month is it lowest?

Home work. 1. Make a diagram with the axis of the earth upright. 2. How would that position affect the length of day and night? 3. Where would the rays of the sun strike the earth vertically all the time? How would such a position of the axis affect the seasons?

Winds of the world. Often, in our study of the different countries of the world, we have referred to the prevailing westerly winds in both northern and southern hemispheres, and we have referred to the northeast and southeast trades. These great wind belts extend around the earth (Fig. 539). Where the air is greatly heated, as in the equatorial region (Fig. 539), it expands and rises. In that region there are few winds, and it is therefore known as the belt of equatorial calms. When air rises slowly, we are not conscious of any motion. The air on either side of the equator in the trade-wind belts moves in toward the equatorial calm belt and then begins to rise, helping to force the air in the calm belt upward.

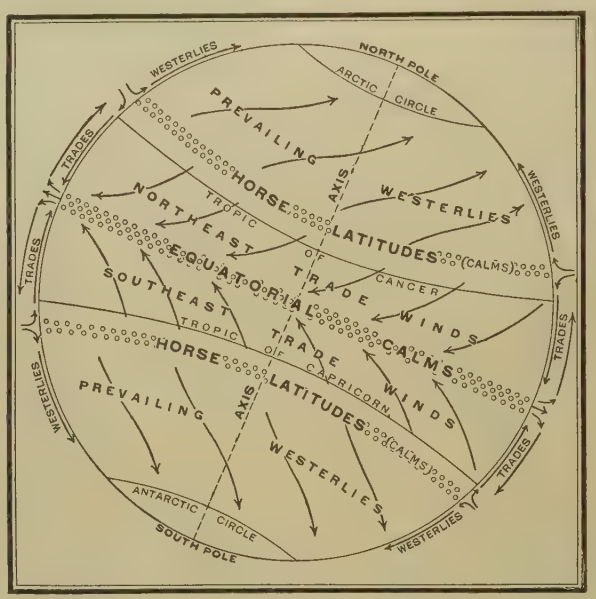


Fig. 539. Which way does the air move in the belt of equatorial calms? in the calms of the horse latitudes? Does the upper air over the trade winds move toward the poles or the equator? Those upper air currents are called *antitrades*

The other two calm belts, one about 30 degrees north of the equator and the other about 30 degrees south of the equator, where the air descends (Fig. 539), are known as the horse latitudes. From these belts of calms the trade winds start toward the equator, and the westerlies start toward the poles.

Monsoons. In connection with the study of Asia, Australia, and some of the islands of the Pacific, special mention was made of monsoon winds, and on page 234 they were explained.

Land and sea breezes. About the shores of all the continents and islands there are land and sea breezes. During the day, when the land becomes warm, the colder air over the water flows inland, making what is known as a sea breeze. At night, when the air over the land cools more rapidly than the air over the sea, the wind is reversed. It moves from the land to the sea and is known as a land breeze. In each case the colder and thus heavier air moves in under the warmer and lighter air and forces the warmer air to rise.

Uses of the winds. The winds are of very great importance to man. They are carriers of rain; they help to equalize the temperature of places near the shore; they hasten evaporation and dry the land after a rain. Wind power is now utilized to some extent, and it may be used more fully when new devices are invented for storing up the energy as electricity. The winds have a most beneficial effect in purifying the air, and have always been of the greatest significance in navigation.

Problems and review questions. 1. Where are the calm belts? What are they called? 2. What winds blow from the horse latitudes toward the equator? 3. In what parts of the world do the prevailing winds come from the west? *See Fig. 539.* 4. Explain land and sea breezes. 5. How do the winds help in commerce? 6. In what other ways are the winds helpful to the activities of man?

Ocean currents. The prevailing winds of the world set the surface waters of the seas in motion. The trade winds on either side of the equator blow the waters on the surface toward the equator and in a westward direction. *See map on page 275.*

In the Atlantic Ocean the equatorial stream flowing westward reaches Cape St. Roque and divides. The northern part flows through the Caribbean Sea, and some of it follows the shore of the Gulf of Mexico. The surface water that leaves the Gulf through the Florida Strait and starts northeastward is called the Gulf Stream. As it crosses the north Atlantic Ocean, helped along by the prevailing westerly winds, it spreads out, moves more slowly, and is called the Gulf Stream Drift. When this current approaches Europe, its waters divide; some flow to the northeast by Scandinavia, and some turn southward and rejoin the equatorial current.

The part of the Equatorial Current that flows south from Cape St. Roque is known as the Brazil Current. When it reaches the belt of the westerlies in the southern hemisphere, it turns eastward, but a part of the water circles northward along the west coast of Africa as the Benguela Current and joins the equatorial current again. In both the north and south Atlantic, therefore, there are great circling masses of water called eddies. In one the motion is clockwise and in the other counterclockwise.

Waters that flow from the equator toward the poles are warm currents, because they carry warm waters into regions where the water is cold. The waters that flow from the polar regions toward the equator are cold currents. When the Gulf Stream flows northward into the arctic regions, it must return by such ways as it can find. Some comes back as the Greenland Current, some as the Labrador Current, and some through Bering Strait.

In the Pacific Ocean there is an Equatorial Current which flows westward and divides when it reaches the islands between Asia and Australia. The part which turns north we call the Japan Current, or the *Kuro Siwo*. It crosses the Pacific to the northeast with the prevailing westerlies, and divides when it reaches North America. The southern part follows the coast of California and is known as the California Current. The northern part is known as the Alaska Current.

The portion of the Pacific Equatorial Current which turns southward and flows between New Zealand and Australia is known as the East Australian Current. When it reaches the belt of the westerlies, it turns eastward, and these winds help it along. As this current approaches South America part of it turns northward and is known as the Peru Current, which in time joins the Equatorial Current and thus completes the South Pacific eddy.

© Henry G. Peabody

Fig. 540. This picture was taken from the top of Mt. Washington and shows the appearance of the cloud-banks which often surround this and other mountain peaks. Can you explain why clouds gather about the slopes of mountains in this way?

During the days of sailing vessels the ocean currents were of very great importance in commerce. The captains chose to travel with the currents, and thus had the advantage of moving with the winds and the water.

The traders in the north Atlantic during the early colonial days would start out from New England with their cargoes and sail for England. From there they would coast southward by France, Spain, Portugal, and the Canary Islands, stopping perhaps in Africa, and on their return westward they would head for the islands of the West Indies. There they might exchange some of their cargoes and secure additional articles for trade with the Atlantic coast colonies when they returned.

The great ocean currents will always remain of some commercial importance, although they do not affect the movements of the great steamships as much as they do the movements of sailing vessels.

The greatest importance of the currents is their effect upon climate. We have frequently noted that the winds from over the warm waters of the Gulf Stream make the climate of western Europe much milder than that in the same latitude on the western shores of the Atlantic Ocean. The Alaska Current, which comes from the Japan stream, always carries warmer waters to the coast, and the air from over those waters blows inland and thus keeps the climate warmer than it would otherwise be.

Owing to the cold current on the west coast of South America the air near the coast of Peru is cool, although Peru is in the equatorial region. The Labrador current chills the water and air along the northeast coast of North America. Sea bathing northeast from New Hampshire is not enjoyed by many, because the water is cold; but the cold waters abound in fish.

Rainfall of the world. Even Aristotle and Plato, the great philosophers of ancient Greece, believed that the waters of the sea must be connected in some way with the waters of the land. They noticed that the rivers were constantly flowing toward the sea, and they thought there must be some return from the sea to the rivers. They believed that the waters of the sea came back through the ground, rising in great cracks, or fissures, through the earth. In that process the sea waters were supposed to have lost their salt.

Centuries passed before the true process was understood. As we now know, the waters from the seas are evaporated. They pass up into the air as an invisible vapor. This vapor cools and condenses. If the temperature where the vapor condenses is below 32° F., tiny particles of ice form, which may fall as snow. If the vapor condenses at a temperature above 32°, it forms tiny globules of water, and when they fall we have rain. Thus the cycle between the waters of the sea and the waters of the land is completed by the moisture passing through the air instead of through the ground.

Over and over again we have studied rainfall conditions. They have a controlling influence upon life in all parts of the world. When we put all the facts together and look at the rainfall chart of the world, certain facts stand out very sharply. First, the heaviest rainfall is

near the equator. This is where it is always hot, where the air is rising and taking much moisture with it. In the hot belt, where there is abundance of rainfall, the great tropical forests are found. Vegetable growth is so dense that we think of those regions as countries of plants rather than as countries for men to live in. The largest tropical forests are in the valley of the Amazon and the valley of the Congo, but the East Indies also have extensive tropical forests. *See maps opposite pages 156 and 230.*

To the north and south of the belt of heavy equatorial rains are belts of lesser rainfall, where there are grasslands. In South America, north of the Amazon jungle, are the grasslands of the Orinoco, and south of it are the grasslands of the Paraná. In Africa, north of the tropical forest of the Congo, are the grasslands of the Sudan, and south of the Congo basin are the grasslands of the southern plateaus. In Australia the great central plain is a grassland, and in Asia the lowlands of India and Siam are in part grass-covered.

The next most striking general fact is that the windward side of all high mountains has heavy rainfall. Prove this by an example from North America; from South America; from Europe; from Asia. Now look at the distribution of the great deserts of the world. Many of them are on the leeward side of a mountain range. The great desert belt which stretches through northern Africa, across Arabia and Persia, and into central Asia is a land which moisture-bearing winds do not reach.

In the far northern country within the arctic circle the amount of rainfall is light. That is because the air, being chilled in its northward journey, gives up its moisture before it gets so far north. The temperature is so low, and there is so little moisture, that the growth of vegetation is stunted. Mosses, grasses, shrubs, and trees a few inches high make up the vegetation of the tundra country. *See map opposite page 266.*

The temperate zones are the most favored. They have variety in temperature from summer to winter, variety in vegetation from place to place, and variety in rainfall, so that almost all kinds of crops can be raised and nearly all occupations can be followed. There are deserts in the temperate zones, but most of the land in these zones is well watered.

The civilized nations of the world have come to occupy the lands of the temperate zones. They seem to have chosen those lands, but it is also true that the climatic conditions in the temperate zones favor the advancement of civilization.

The geography of a country, including climate, physical features, and natural resources, determines the activities of the people, and in part the degree of civilization which they may attain.

MAP STUDIES

Rainfall of the world. On the map on the opposite page, showing the distribution of rainfall, the continents are represented in their correct relative sizes. 1. Which is the largest? Which is the second largest? Which is the smallest? *See Appendix, page viii.*

2. Where are the most extensive desert lands of the world? Give the names of these deserts. 3. Are the tundras of the world, as shown on the various relief maps in this book, in wet or in dry regions? 4. Is the rainfall heavier near or far from the equator?

5. Where there is very heavy rainfall at a distance from the equator, what special explanation is there? 6. In general, is the rainfall heavier near the margins of the continent or in the interior? Give examples. 7. In general, is the rainfall heavier in mountainous regions than in lowland regions? Give examples.

8. Which continents have the larger areas of heavy rainfall? 9. Are those places of very heavy rainfall densely populated? 10. What is the general average amount of rainfall in the regions of the world that are most densely populated? 11. Select three or four places where grazing is an important occupation. What is the usual amount of rainfall there?

Oceans. The map on the opposite page, showing the ocean currents, is drawn so that the oceans appear in the correct relative sizes. 1. Which ocean is clearly the largest? 2. Estimate how many times larger the Pacific Ocean is than the Atlantic. *See Appendix, page v.*

3. Which way do most of the surface waters move in the equatorial regions of the Atlantic and Pacific oceans? 4. What winds cause these currents? 5. Compare the surface circulation in the north Atlantic Ocean with that in the south Atlantic.

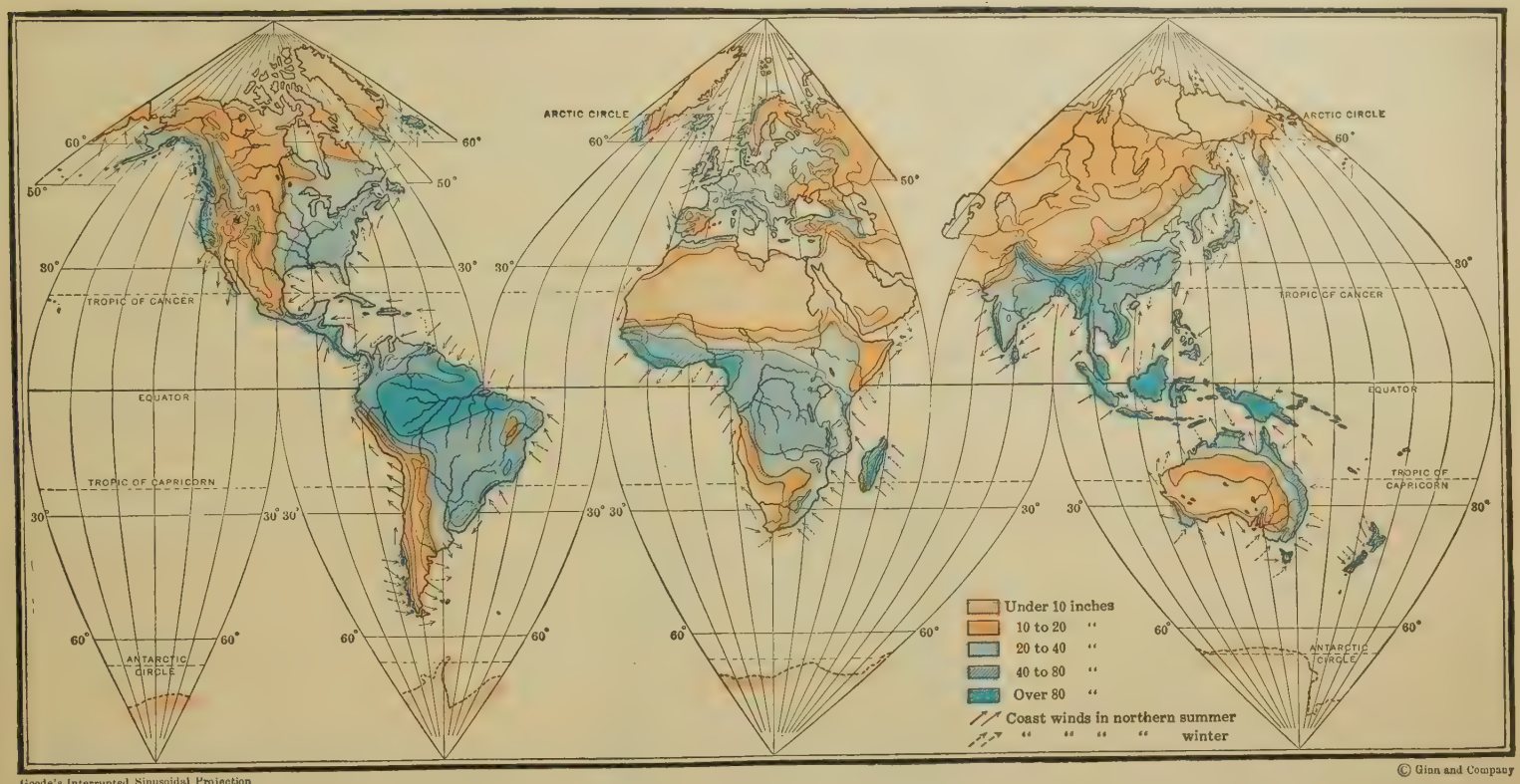
6. Which motion is clockwise? Which one is counterclockwise? 7. Is the general circulation in the north and south Pacific like that in the north and south Atlantic? 8. The monsoon winds in the northern part of the Indian Ocean change the direction of the surface currents from season to season.

9. Compare the temperature of the surface waters on the east and west sides of South America in the latitude of Buenos Aires. Why is it warmer on one side than on the other in the same latitude?

10. Compare the surface temperatures of the water near Newfoundland and in the same latitude on the west coast of Europe. Why is there a difference? 11. In what part of the north Atlantic west of Europe is the temperature about the same as it is at the surface near Newfoundland?

12. What is the name of the cold current that comes southward along the northeastern coast of North America and reaches to the New England states? 13. What current affects the climate of Alaska and British Columbia? 14. Where are the surface temperatures of the sea the greatest?

15. How warm is it in those places? 16. How does that temperature compare with the temperature of the water which you would use for a warm bath? 17. What is the temperature of the water near Cape Horn? 18. What is the temperature of the water near the southern tip of Africa? 19. How can the difference in these temperatures be explained?



Goode's Interrupted Sinusoidal Projection

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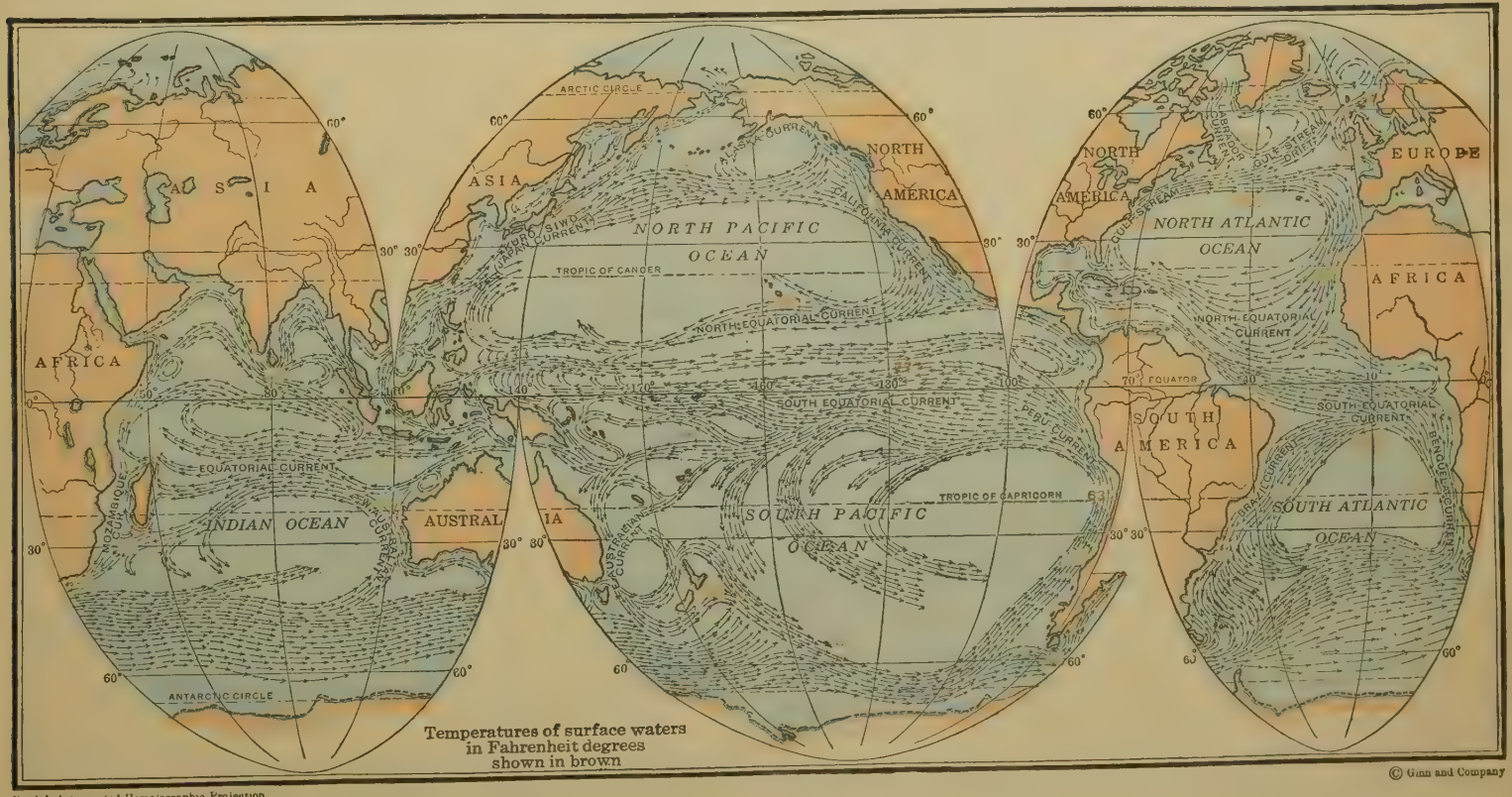
Average annual rainfall of the world



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Ocean currents and the temperature of the surface waters

THE EARTH IN THE UNIVERSE

We have learned that the earth is a spherical body floating in space. It is not a perfect sphere, for it is flattened at the poles, and the diameters that pass through the earth at the equator are not all equal. We know that it rotates on an inclined axis each day and revolves about the sun each year.

The moon travels with the earth in its annual journey about the sun, and once each month the moon goes around the earth. There can be no life on the moon, for it is without an atmosphere and without water (Fig. 541). Its light is all reflected from the sun's rays, and the temperature at the surface is very low.

Eclipses. When the moon is between the earth and the sun, and the shadow of the moon strikes the earth in the part where we live, we have an eclipse of the sun; that is, we cannot see the sun, because the moon is in the way. When the earth is between the sun and the moon, and the shadow of the earth falls on the moon, there is an eclipse of the moon.

Fig. 541. The five-day moon as it looks through the telescope

The planets. There are eight planets, and they revolve about the sun. Named in order from the sun, they are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. To those living upon the earth the seven other planets appear as stars. Because of their movements about the sun they do not always appear in the same part of the heavens. They are wanderers. Mercury is small and difficult to see, for it rises and sets near the time when the sun does. Venus is a beautiful star and appears either just before sunrise, in the east, as a morning star, or just after sunset, in the west, as an evening star. Mars is redder than most of the stars. There is a snow-field about the polar region of Mars, and this snow-field grows larger in the winter season and smaller in the summer season. Jupiter is a very brilliant star with several moons. Saturn appears as a star, but if looked at through a telescope it is found to be quite unlike the other planets in having two brilliant rings and several moons.

The solar system. The sun, the planets with their moons, and a number of smaller bodies that we cannot see, in the space between Mars and Jupiter, make up the solar system. This great system is floating in space. The sun is at the center, and all the other members of the system move about the sun and receive heat and light from it.

The fixed stars. Beyond the solar system, far, far off in space, are the fixed stars. They are suns shining by their own light, as our sun does. The thousands and thousands of stars that we see on a clear night are so far away that it takes years for their light to reach us, although light travels 186,000 miles per second. If you look at the North Star to-night, remember when you see it that the light which enters your eye started from the star forty years ago.

Shooting stars. Sometimes a fragment of a distant star flying through space comes into our atmosphere. By friction in the air it becomes white-hot, and then we see it and call it a shooting star. Most of the shooting stars burn to dust, but a few fragments reach the earth and are picked up and exhibited in museums. Such fragments of stars are called meteorites.

Natural sciences. The study of geography leads to an interest in many sciences. Physics deals with the great physical forces of nature; chemistry deals with the changes that take place in matter; zoölogy takes up the study of animals; botany leads to a knowledge and understanding of plants; geology deals with the history of the earth; but the science that can stretch our imagination most is astronomy. This treats of all the bodies in the universe, of the immense distances between heavenly bodies, of whirling nebulæ, of comets with their fiery tails millions of miles long, of shooting stars, and of many other wonderful and inspiring phenomena of nature. One of the most remarkable things is that all these heavenly bodies are controlled by definite laws. The appearance of the planets as morning or evening stars, the eclipses, the return of comets, may be figured out and predicted hundreds of years ahead of their coming.

All the great natural sciences lead us to realize that the forces and laws of nature are far beyond the powers of man to control. We may look forward to discovering more and more of these laws, and, through our knowledge and will, to improving the living conditions on this earth. The study of the sciences leads us, however, to recognize that there is a power in the universe much greater than that in human beings.

Home work. 1. Make a diagram of the constellation Ursa Major, or Great Dipper, and show how those stars help one to locate the North Star. Find the Great Dipper in the northern sky and locate the North Star. 2. Make two diagrams to show how eclipses of the sun and moon occur.

THE UNITED STATES — A WORLD POWER

A STUDY IN ECONOMIC GEOGRAPHY

INTRODUCTION

We have now studied all the countries of the world. The people are nearly everywhere engaged in producing and distributing food and in providing shelter, fuel, clothing, and other comforts. Most people, however, find some time for recreation.

Certain countries are densely populated. Some have acquired great wealth and become world powers. In a very short period in the history of the nations the United States has become one of the leading powers in the world. Millions of people have migrated from the Old World to the New World. Why have they done so? Will people continue to leave the Eastern Hemisphere and come to live in the Western Hemisphere? Most of our foreign commerce is now with the people of western Europe. Will that continue to be true? It is important for every American citizen to know why this country is so attractive to settlers and how the United States became a wealthy and powerful nation. It is important that we appreciate the leading position we have come to hold in the world, and the responsibilities that now lie before us.

In our earlier study of the United States we learned that the life and occupations of the people in each of the natural regions depended chiefly upon the climate, physical features, and natural resources in that part of the country. We cannot greatly modify the physical features, but the remarkable work of engineers has made it possible to overcome many difficulties that physical features once presented. Great rivers are bridged, canals are made, tunnels are driven beneath rivers and through mountains, wet lands are drained, dry lands are watered, travel and the transportation of goods on land and water have been made easy, and travel and the transportation of small articles in the air are becoming more common. The submarine cables, the telephones, the telegraphs, and the equipment for wireless telegraphy have made it possible to communicate quickly with almost any part of the world.

We have not discovered any way to modify the climate, and yet men have learned how to live in comfort under various climatic conditions. Homes are warmed artificially, and they may also be cooled artificially. We change the weight of our clothing from season to season. Clothes may be dried regardless of the weather. Hothouses are built, where vegetables may be raised at all seasons. Rivers are diverted to water desert lands.

The scientific study of the air has led to the prediction of weather conditions. This is of very great value to man. The foretelling of frosts, floods, and storms, and especially storms at sea, is a wonderful step forward in the conservation of life and property. Men will continue to invent ways of overcoming some of the disadvantages that come with the changes in the weather from day to day and with the changes in the climate from season to season.

In the development of our natural resources there are almost limitless possibilities. Here the activities of men are of very great importance, and therefore the more we know about the natural resources the better it will be for us and for the nation. The industrial and commercial prosperity of the United States depends largely upon the proper use and conservation of these resources.

NATURAL RESOURCES OF THE UNITED STATES

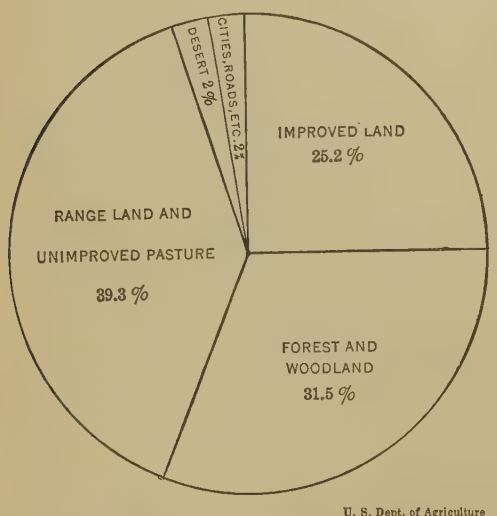
SOILS

The most valuable of all the natural resources in this country are the soils. They form a layer, or mantle, of loose material that covers most of the land surface. When an excavation is made in this loose material, we usually find that the upper part, which contains decayed vegetable matter, has a darker color than that below. That upper, darker part is the soil, and the more compact material just below is the subsoil. In many excavations men have gone below the subsoil and come to the solid rock of the earth.

Cultivated land in the United States. The amount of cultivated land in this country has been rapidly increasing until now there are nearly 320,000,000 acres that yield crops (Fig. 542). In almost any part of the United States where there is good soil and sufficient rainfall, farming may be profitable. In many other places where the soils are fertile but where the rainfall is very light, irrigation is practiced and excellent crops are obtained.

We have under cultivation 3.5 acres for each person in the country, while most European countries have from 1 to 1.5 acres of cultivated lands for each of their inhabitants. In the United Kingdom the land yielding crops amounts to less than half an acre for each person. The only countries where more acres per person are cultivated than in the United States are the sparsely settled countries such as Argentina and Canada.

The table in the next column indicates the percentage of land that is cultivated in those states where the amount is over 20 per cent of the total area of the state. Iowa now stands at the head of the list. More than 80 per cent of the whole area of this state is under cultivation. Nearly all the states in the upper portion of the valley of the Mississippi rank high, while those states that are in mountainous or dry regions of the west are so far down in the list that they do not appear in this table.



U. S. Dept. of Agriculture

Fig. 542. There are 1,903,000,000 acres of land in the United States. This diagram shows how the land is being used. Notice that about one fourth of the land is improved. This means that it is cultivated. Much of the forest and woodland can be improved and used to produce farm crops

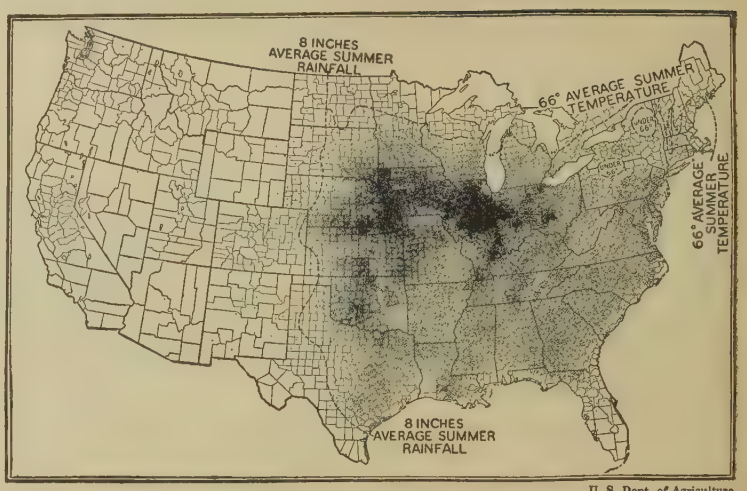


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Fig. 543. Each dot on this map represents 5000 acres which are devoted to the raising of corn. Notice that most of the corn is grown where the summer rainfall (June, July, and August) amounts to more than eight inches, and where the average summer temperature is over 66° F. What are the chief corn-producing states?

PER CENT OF IMPROVED LAND IN TOTAL LAND AREA (1920)

State	Per Cent	State	Per Cent
Iowa	80.4	Oklahoma	40.8
Illinois	76.1	South Dakota	37.0
Indiana	72.3	Virginia	36.7
Ohio	71.1	West Virginia	35.9
Kansas	58.5	Wisconsin	35.2
Missouri	56.5	Michigan	35.1
North Dakota	54.7	Georgia	34.7
Kentucky	54.3	New Jersey	32.3
Delaware	51.9	South Carolina	31.7
Maryland	49.3	Mississippi	31.4
Nebraska	47.0	Alabama	30.1
New York	43.1	Vermont	29.0
Tennessee	41.9	Arkansas	27.5
Minnesota	41.5	North Carolina	26.3
Pennsylvania	41.3	Connecticut	22.7

This country's very great extent of cultivated land with a good yield per acre assures Americans a large food supply. The United States produces more food per person than any other country with a large population. This is one of the most important facts in explaining the comfort and well-being of the people in this country and the immigration of people to the United States. More food is produced in the United States than is needed by the population, and that makes it possible to ship large quantities to foreign countries.

Our leading food crops. Corn is our largest crop, and we use most of the corn we produce. Of the 2,700,000,000 bushels produced, on the average, each year from 1910 to 1914 only 41,000,000 bushels were exported. During that same period we produced, on the average, 1,100,000,000 bushels of oats, and exported each year only 10,000,000 bushels. We should remember, however, that corn and oats are largely fed to live stock, and that we export large quantities of meat each year (Fig. 543).

Wheat is one of the most important food crops in the world, and we produce so much wheat that we can export over 100,000,000 bushels a year. The United States is one of six countries that have a larger amount of wheat than they need (Fig. 544). The others are Russia, Canada, Argentina, Australia, and India. In Russia and India the people do not use as much wheat per person as in other large wheat-producing countries.

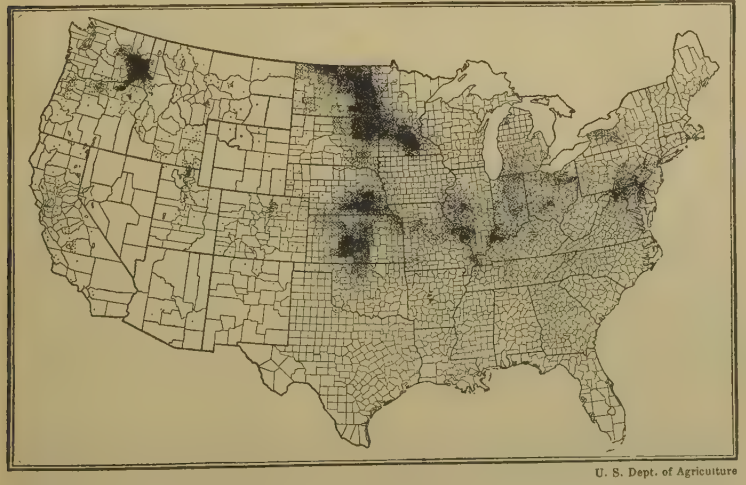
The chief countries that import large quantities of wheat are the United Kingdom, Germany, Belgium, Italy, France, and the Netherlands. A large part of the wheat exported from the United States goes to the United Kingdom, the Netherlands, and Belgium.

The United Kingdom is our largest customer for food crops, and the Netherlands is second; but much of the food shipped to the Netherlands is reshipped to other countries in continental Europe.

Large quantities of fruit and vegetables are now being raised in the United States. Near each of the cities there are areas devoted to intensive truck, or garden, farming, and throughout the country almost every farmer has a vegetable garden. More and more land is being used for orchards.

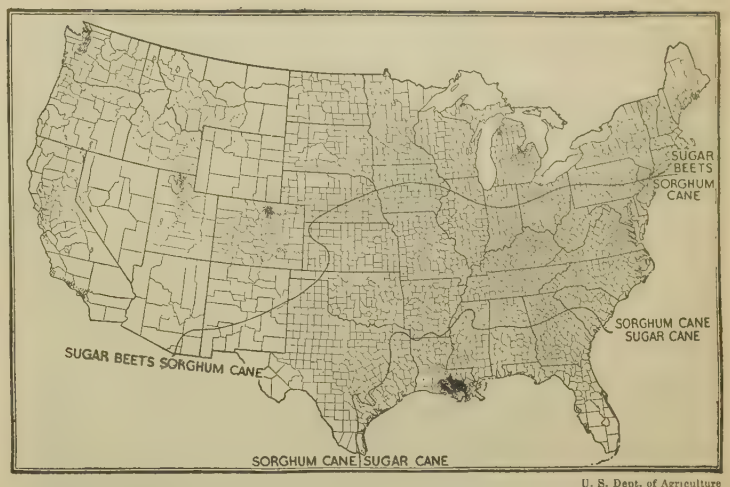
Our chief food imports. As a nation we use each year more coffee, sugar, and rice than we produce. These are brought from other countries. We depend also upon foreign countries for tea, olive oil, cocoa, and bananas.

The people of the United States could easily produce more rice, more sugar, and more olive oil, for the geographic conditions in southern California, in the Southern states, and in our island possessions are favorable to their production, and the crops are usually increased each year. We shall without any doubt always depend upon foreign countries for most of our coffee, tea, cocoa, and bananas.



U. S. Dept. of Agriculture

Fig. 544. Each dot on this map represents the production of 100,000 bushels of wheat. What states are evidently the chief producers of wheat? Very little wheat is raised in the southeastern states that border on the Gulf of Mexico or the Atlantic Ocean, for the climate there is too moist. Why is so little wheat raised in New Mexico? Arizona? Nevada? Wyoming? New England?



U. S. Dept. of Agriculture

Fig. 545. Each dot on this map represents 1000 acres of land which are devoted to sugar crops. Notice that there are three distinct belts of sugar crops: in the southeast, especially on the delta of the Mississippi River, sugar cane is raised; farther north and west sorghum cane is grown; and still farther north and west are the fields of sugar beets

A small amount of coffee is raised in Porto Rico and Hawaii, but three fourths of our coffee is imported from Brazil, and most of the remainder from other countries in South America or Central America. In the United States we use, on the average, 9.4 pounds of coffee per person each year. That is a tremendous amount of coffee and represents a very large import business.

Most of the tea used in the United States comes from Japan and China. We use, on the average, about one pound per person each year.

A high grade of olive oil is now being produced in this country, but we still import large quantities from both Italy and France.

We produce in this country, on the average, 7.4 pounds of rice per person, but we use 9.6 pounds. That means a large import trade. Japan and China furnish nearly all the rice we need to import. The production of rice on the low lands of our Southern states might well be increased.

As a people we consume a very large amount of sugar. The amount produced in the States, in Hawaii, and in Porto Rico is not enough to satisfy the demand, and large quantities are therefore imported, chiefly from Cuba. We might, however, greatly increase our production of beet sugar in the United States (Fig. 545).

We receive most of our cocoa from the West Indies and South America, and the bulk of our supply of bananas comes from Central America and the West Indies.

From this summary of food imports it may be seen that the United States depends upon foreign countries for very few articles of food that are of real importance, and that most of those are supplied by countries in the Western Hemisphere.

Fig. 546. This is a deep-tillage machine for use on land that must be plowed especially deep. The use of agricultural machinery, in place of hand labor, is one of the means by which the production of food crops in our country may be increased. What other ways can you suggest?

Fig. 547. This man is testing the soil to find out how much moisture it contains. In this way he can judge what crops can best be grown on the land, and whether irrigation or dry farming will be necessary. Can you explain what dry farming is? Of what value is it?

Can we increase the production of food crops? This will be the important question in the United States as the population increases. Most of the better farming land is now in use, but there are several possibilities before us.

1. *More land to be cleared.* There are some forested areas, some woodlands, and some cut-over areas that are suitable for cultivation and could best be used as farm lands. The United States Department of Agriculture has estimated that there are about 200,000,000 acres of such lands that could be used for raising food crops after they are cleared. If this land were divided into farms of 160 acres each, it would provide 1,250,000 such farms. That would be an addition of about 20 per cent to the number of farms now in the United States.

2. *More land to be drained.* The Department of Agriculture has made the estimate that there are at least 60,000,000 acres of swamps and other wet lands that can be drained and made suitable for the production of food crops. These lands could all be cultivated, and they might be divided into 160-acre farms and thus make 375,000 more farms in the United States. These lands are located largely in the great flood plain of the Mississippi River and in the flood plains of other rivers, chiefly in the Gulf Coastal Plain. There are also wet lands and peat bogs in the Northeastern states and in those states near the Great Lakes that were invaded by the continental ice-sheets.

3. *More land to be irrigated.* There are probably 30,000,000 acres of land in the West that could be irrigated if necessary. That is about double the present amount of irrigated land. It should be noted, however, that there are more lands all ready to be irrigated in several of the national irrigation projects than people are willing to buy at present prices (Fig. 548).

Fig. 548. This dreary-looking desert region can be transformed into good farming land if it is properly irrigated. Describe the changes that would come to such a region through irrigation

4. *Use of stony lands.* Many of the stony pastures and hilly regions may in time be used for raising crops. These are located chiefly in the well-watered Eastern states and include some of the so-called abandoned farms of New England. Much of this land is suitable for orchards.

5. *Dry farming.* Methods of dry farming may be improved, and more semidesert land can then be profitably used in this way (Fig. 547).

6. *More intensive cultivation.* By practicing more intensive cultivation, by using greater quantities of fertilizers, and by taking advantage of scientific discoveries, the production of food crops per acre can be increased. This means a better use of the better lands. Many of our farmers have been very successful in increasing the production per acre on their lands, but the average yield per acre in the United States is below that in several of the older countries. For example, while we produce on the average a little more than 15 bushels of wheat per acre, Belgium produces nearly 40 bushels per acre, and in fact nearly all the countries of western Europe produce more per acre than we do. There are great possibilities in increasing the production per acre of the leading food crops of the United States (Fig. 546).

Problems and review questions. 1. How does the amount of cultivated land in the United States compare with that in other large countries? 2. Why is the cultivation of the soil so important to the welfare of a nation?

3. What are our chief food crops? 4. Which of the food crops are so large that we have some of the raw material to export? 5. What nation is our largest customer for foods? 6. What are the chief foods imported by the United States? From what countries do most of them come?

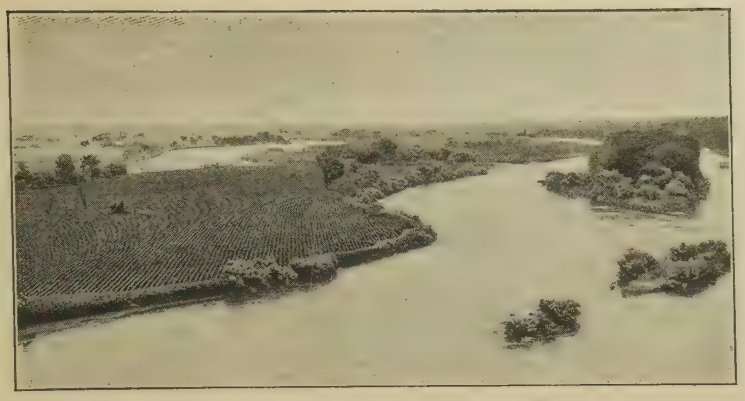


Fig. 549. The low flood plains along the rivers are among the richest agricultural lands in our country. They are flat, extremely fertile, and easily cultivated. Such lands must be protected against the spring floods which sometimes wash away the soils and make it necessary for the farmers to plant their fields a second time

7. Which of the foods imported in large quantities come from the Eastern Hemisphere? 8. How may the amount of land available for farms be increased? 9. How may the production of food crops per acre be increased?

Home work. 1. What kinds of soil are there in the vicinity of your home? How thick are they? Have they been fertilized? If so, how? 2. What are the chief products from the soils in the vicinity of your home city or town?

Conservation of soils. Plants receive much of their nourishment from the soils, and the animal life of the world depends upon the plant life. It takes but a moment's thought to make us realize that we are absolutely dependent upon the soils from which most of our food and all of the raw materials for our clothes come directly or indirectly. Human beings could not live on this earth if there were no soils here, and the prosperity of a nation usually depends chiefly upon the extent and quality of its soils. Therefore the preservation of the soils and the maintaining of their fertility are the most important of the problems of conservation that are before this nation.

To preserve the soils we must see, in the first place, that they are not washed away (Fig. 549). The rivers are very active, and each year they gather up millions of tons of the very best of soil-making material and carry it to the ocean or to the lakes. In some places in our country, where the forest or other native vegetation has been removed from steep slopes and the land cultivated, the soils have been washed away in from ten to fifteen years. That is a great mistake. China has ruined thousands of acres of good land in that way, and we should not be guilty of such foolishness. Slopes that are too steep to hold their soils when cultivated should be left forested or should be used as pasture land.

In plowing lands that are not level or nearly so, care should be taken not to have the furrows run with the slope. When they run with the slope, rain water collects and flows in the furrows, increasing in amount and speed until streams form which carry away the soil. On lands that have even a gentle slope, that is, from 5 to 15 degrees, contour plowing should be practiced. In contour plowing the furrows follow around or along the hillsides. Each furrow is at a definite level. Such furrows do not make runways for the rain water, and the soils are not washed away. In addition to saving the soils, contour plowing forces more of the rain water to sink into the ground, and that water is absorbed by the plants and helps to produce larger or better crops.

Fig. 550. Among the mechanical inventions of recent years none has been more useful to the farmer than the motor tractor. This tractor is driven by an automobile engine and is used to draw the different farm machines over the fields, thus doing the work which formerly was always done by horses

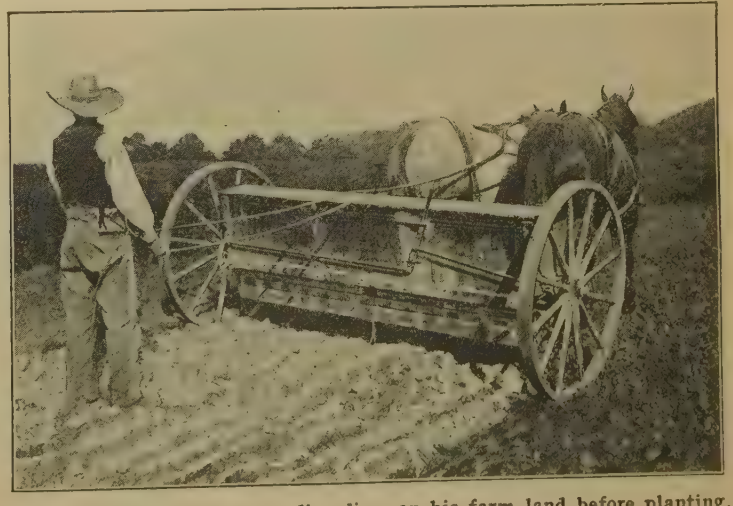


Fig. 551. This man is spreading lime on his farm land before planting. Lime is an important fertilizing substance. By mixing it with such soils as need it the farmer can increase the amount of crops which his land will yield per acre. What would happen if farmers never fertilized their land?

Fig. 552. Here is a Kentucky hemp field after the harvest season. The hemp is stacked up to allow the straw to decay enough so that the fiber can be separated easily. This process is called retting. Hemp-growing in the United States is not important as compared with the European industry

Slopes that are steeper than 20 degrees should ordinarily be used for forests or some tree culture. Orchards may be planted on such hillsides. If a field is not used, it should have some protective covering, such as clover or soy beans, to help hold the soil and to enrich it.

To maintain the fertility of the soils we must follow the advice of intelligent, experienced farmers, of trained students of agriculture, and of other scientists who have made special studies of this problem.

The air, water, and soil contain in abundance most of the food elements needed by plants. There are, however, three elements — nitrogen, potassium, and phosphorus — that plants use up very rapidly; and if we wish to use the lands continuously in farming, we must assist in returning these elements to the soil (Fig. 551).

Nitrogen. Certain plants such as the grains, cotton, and tobacco take large quantities of nitrogen compounds from the soil. After such crops have been raised, other plants that help to restore nitrogen to the soil should be planted. A group of plants that include clover, alfalfa, peas, and beans have little nodules on their roots, where bacteria live. The bacteria take nitrogen from the air and combine it with other elements to make compounds called nitrates. The nitrates are stored in the roots, stalks, and fruits of those plants. The farmer who "plows under" such a crop will therefore enrich his soil with nitrogen.

Fig. 553. Many boys in Ohio and southwestern Pennsylvania have learned to take care of sheep. This district, with its good pasture lands, has become famous for its pure, high-bred stock. *See map, Fig. 556*

By choosing wisely and changing the crop on a field each year, the fertility of the soil may be maintained or even improved. The practice of changing the crop on a given field each year is called the *rotation of crops*. Repeating the same crop on a given field year after year will result in poorer crops and in injury to the soil.

By using electricity nitrogen may be taken from the air and combined with other substances, such as limestone, to make fertilizers. This is now being done. Certain nitrate deposits in Chile are imported and used to fertilize worn-out soils, and manures are also used on the fields so as to return nitrogen compounds to the soil.

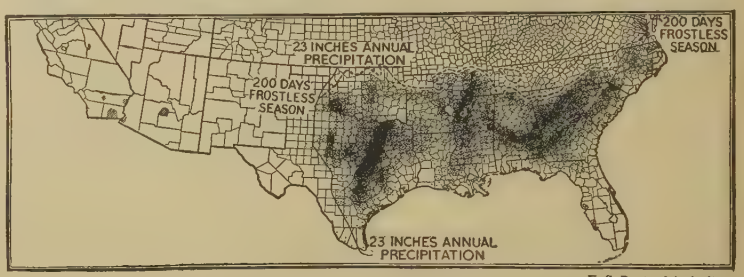

200 DAYS FROSTLESS SEASON
23 INCHES ANNUAL PRECIPITATION
200 DAYS FROSTLESS SEASON
23 INCHES ANNUAL PRECIPITATION
U. S. Dept. of Agriculture

Fig. 554. Each dot on this map represents 5000 acres of land where cotton is raised. Very little is grown where there are less than 200 days without frost or less than 23 inches of rainfall each year. The places where the dots are thickest have very rich soils. The shaded areas in California and Arizona are places where the especially fine Egyptian variety of cotton is being raised

Potassium is another important element in the food of plants that we must help to keep in the soils. Potassium salts are sometimes imported for use as fertilizers. Kelp, which grows in large quantities on the surface of the Pacific Ocean west of North America, has been used to produce potassium compounds, and some deposits of potassium salts have been discovered in the western part of our country.

Phosphorus is the third food element of plants that is important for us to assist in returning to the soils. Phosphate rock has been found in large quantities in Florida, South Carolina, Tennessee, Utah, Wyoming, and Idaho. More phosphate rock is quarried in Florida each year than in any other state. The rock is ground up and used in the manufacture of a very good fertilizer.

Phosphorus compounds are made from the bones of animals and other by-products from the great slaughterhouses. Those compounds are returned to the farmers as fertilizers.

Manures also contain phosphorus compounds and are therefore doubly valuable as fertilizers. They contain both nitrogen and phosphorus compounds.

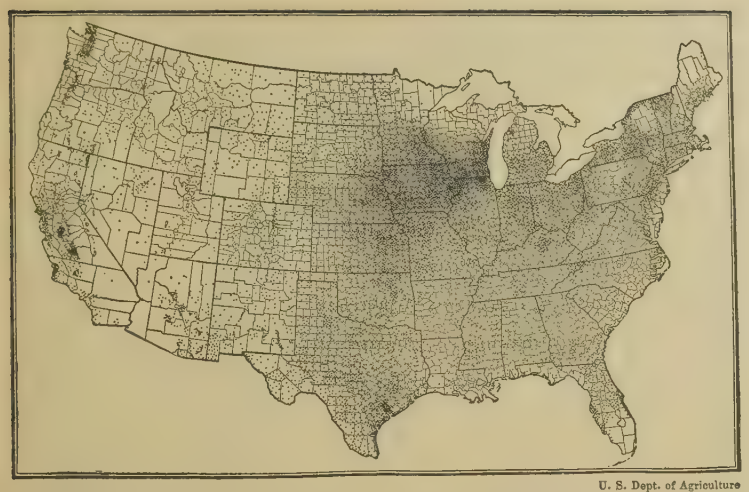


Fig. 555. Each dot on this map represents 5000 cattle. In what states are the largest numbers raised? Explain the clear spaces in northern Maine, northeastern New York, southern Florida, southern Nevada, southeastern California, and western Arizona. Why is cattle-raising more general in the eastern half of the United States than in the western half?

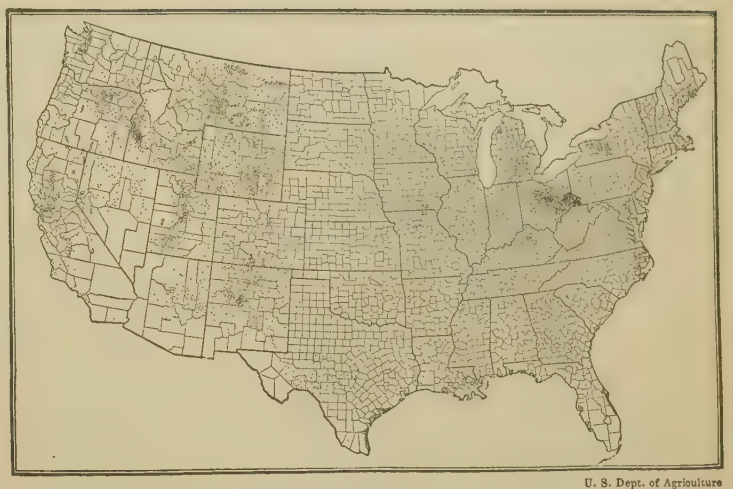


Fig. 556. Each dot on this map represents 10,000 full-grown sheep. Most of the sheep in the United States are in the Rocky Mountains and the semi-arid or mountainous parts of the states on the Pacific coast. The hilly pasture lands of Ohio and the neighboring parts of Pennsylvania and West Virginia are also used for sheep-raising (Fig. 553)

Other uses of the land aside from the production of food crops. The crops of cotton, flax, and hemp are also of great importance to the people of the United States. The cotton is used for making cloth, and the cotton seeds yield an oil that is being used more and more as a food. It is taking the place of olive oil in many ways, and it is used in making soap. After the oil has been extracted, the rest of the seed is used as a food for cattle or sometimes as a fertilizer (Fig. 554).

Flax is used in making linen, and the seed furnishes linseed oil, which is used in the making of paints, oil-cloths, and other useful things. The chief use of hemp is in the manufacture of rope (Fig. 552).

Live stock could not be raised if it were not for the grasses and grains that are supported by the soils. Horses, mules, cattle, sheep, and goats are needed in large numbers. Many of the lands that are semiarid or have soils too poor to be cultivated are used for grazing. Among the mountains there are excellent pasture lands for sheep and cattle (Figs. 555, 556).

Dairy cattle are raised very generally throughout the country to supply local needs. Near each of the larger cities there are many dairy farms. Creameries are very common in the southern parts of Minnesota and Wisconsin, in the northern portions of Iowa and Illinois, in New York State, in eastern Pennsylvania, and in the New England states. About half of the cheese factories in the United States are in Wisconsin, and over one fourth are in New York State. Dairy farming is most prosperous in regions with rich pastures near large markets (Fig. 557).

Hogs are produced chiefly in the corn belt, although they are common throughout the more thickly settled, well-watered portions of the United States east of the Great Plains.

Poultry-farming is also an important industry, and near each of the large cities the poultry farms are numerous and cover considerable areas of land.

Fig. 557. These are dairy cows. They are tended with great care, so that they may produce rich, pure milk. After the morning milking they are turned into a good pasture to graze. Toward evening they are driven into a barn, where they are milked; then they are turned out for the night

Problems and review questions. 1. Why is it of the greatest importance to the nation to maintain the fertility of the soils? 2. How do the plants secure their food? 3. What food elements needed by the plants should we help to keep in the soil?

4. What kinds of fertilizers do you know of? 5. What plants help to restore nitrogen to the soils? 6. What is meant by *rotation of crops*? 7. Aside from the production of food crops, what uses are made of the land? 8. What industries are directly dependent upon the raising of cotton, flax, and hemp?

9. What industries depend directly upon the raising of animals? 10. What arguments can you now give in support of the statement that the soils are the most important of the natural resources of the nation?

FORESTS

Original extent. The original forests of the United States were among the most valuable in the world. They covered a large area and contained a great variety of useful trees (Fig. 558).

Destruction of our forests. Nearly half of the more valuable timber in this country has been cut. We have been a most extravagant people in the use of wood. It is estimated that on the average we now use per person ten times as much wood as the people in France and about twenty times as much as the people in Great Britain.

In the early days of settlement in the eastern half of the country the forests were often considered objectionable. It took a great deal of hard work to clear the fields for cultivation. Many times there was no market for the wood, and great piles of logs were burned. With the rapid increase in our population came a very large demand for lumber. More wood was used as fuel than in any other way; but millions of homes were built, great factories were constructed, and fences, barns, furniture, and thousands of useful articles were made of wood. Of late years large quantities of wood are being used in the manufacture of paper.

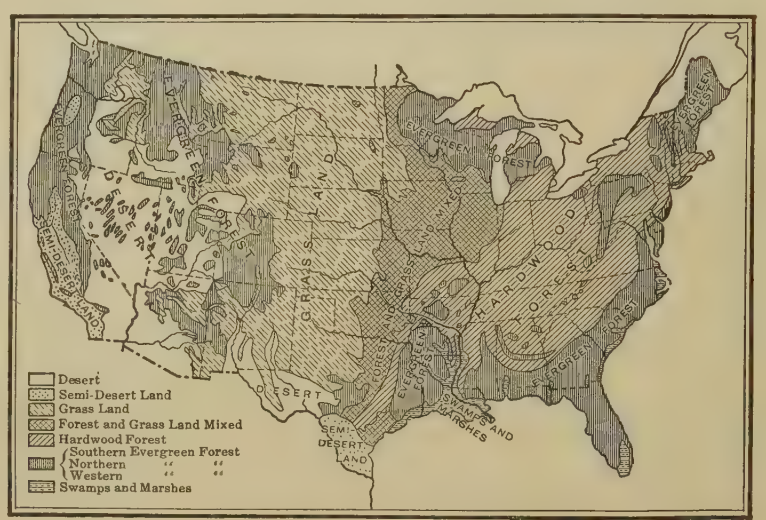


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Fig. 558. This map shows the forest areas of the United States. Originally the forests were almost unbroken from the Atlantic coast to the eastern margin of the Great Plains. To-day much of this great area has been cleared. Where are the evergreen forests? Where are the hardwood forests? Why are there so few trees in the Great Plains and the Western Plateaus?

In some places where the forests have been destroyed the soils have been washed away, and that has increased the danger of river floods. The forests bind the soils, and the soils help to retain the rain-water in the ground, or allow it to flow away slowly and evenly. If our forests had not been removed, the flow of many of the streams in this country would be more uniform, and that would make the streams more valuable in developing water-power.

Waste in the use of wood. While we have used wood freely and for the most part for excellent purposes, we have been guilty of wasting large quantities of very valuable timber. Many times, when the trees were cut during the winter and heavy snows were on the ground, high stumps were left. Thousands of trees that have been blown down have been left in the forest, and many undersized trees have been taken for lumber. Each tree should be allowed to mature and thus gain its full size before it is cut down. Men in sawmills and in factories and those who are engaged in building houses have not always been careful to use up the small pieces of lumber.

The old-fashioned way of tapping certain pine trees to get the sap, or resin, from which turpentine is made, usually killed the trees within five years. If modern methods are used, the trees will live much longer and even more resin will be secured.

Forest fires have been one of the chief causes of loss. Some of the fires have been unavoidable, such as those caused by lightning, but many have been due to carelessness. It is of the greatest importance that campers should not leave fires burning. Everyone who visits our forests should take care not to cause a forest fire, and should volunteer, if possible, to help put out such a fire.

Lumbering districts. The forests in New England were the first center of the lumbering business; later Michigan became the leading producing region; and as settlement pushed westward Wisconsin and Minnesota each had a turn at first place. When the Northern forests had been largely used, those in the Southern states were turned to, and then the forests of the Northwest. To-day Washington produces more lumber than any other state, and Oregon ranks third. Each one of the states bordering upon the Gulf of Mexico is a large producer of lumber. Mississippi stands fourth of all states in production (Fig. 559).

A permanent supply of lumber. It is of real importance to us to have, here at home, a permanent supply of lumber that will meet our needs. Most of the European countries import wood. Russia, Sweden, Norway, Czechoslovakia, and Austria are the only countries in Europe with wood to spare. Those countries are cutting more each year than can be grown; their surplus will therefore become less, and undoubtedly it will all be needed in Europe. The countries of Africa, South America, Central America, and Mexico have little but tropical woods, which are more difficult to work than the softer woods of the temperate zone. Canada is now selling some lumber to us, but it cannot help very much. China, Australia, and India now have less lumber than they need. Siberia has the one large unexplored and almost untouched temperate forest in the world.

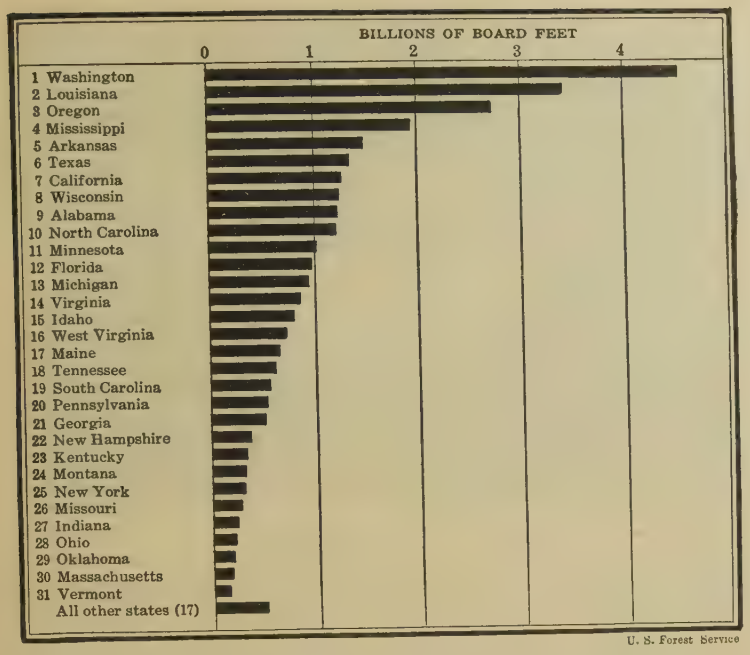

Fig. 559. This table shows the order of importance of the states in the production of lumber. A board foot of lumber is a piece of wood 12 inches square and not over 1 inch thick. How does your state rank in lumber production? If its name does not appear, explain why its production is so small

There are, however, several ways by which we may help to provide a good permanent supply of lumber in this country.

1. So far as possible we must stop the various wastes already mentioned.

2. Burned-over areas should be reforested.

3. Many areas where the forests have been cut off have soils too poor to cultivate. Such areas should be reforested.

4. Many forests are not fully stocked with trees. In such places more trees should be planted. No soil is too poor and no slope too steep for trees if they can get hold with their roots and receive enough moisture throughout the year. Experiments have shown that a mixed forest will produce more cubic feet of wood per acre per year than a forest of only one variety of tree. Some trees are very eager for the sun, and others do fairly well in partly shaded places. This is illustrated in the natural forests of Washington and Oregon. There the great Douglas fir is the tall tree, and with it are the much lower hemlock and red cedar. By study and experiment we must learn how to secure the maximum production of wood per acre, just as we strive to secure the maximum production of wheat per acre.

5. The life of much of the timber that we use may be extended by dipping it into creosote. That is a tarry liquid which will fill the pores of the wood and prevent water or insects from entering and causing decay. Posts, railroad ties, paving blocks, shingles, and the wooden piles of wharves and bridges, when properly treated with creosote, last many years longer than they otherwise could.

6. We must keep up a constant battle with the insects that injure and may kill the trees.

7. In many cases substitutes for wood may be used. This is being done on a large scale. Natural stones, bricks, concrete, terra cotta, tiles, and steel are now commonly used in building. Steel cars are taking the places of wooden ones, and steel furnishings in offices and libraries are in use. These substitutes for wood also offer a great advantage in reducing the losses by fire. That helps in the conservation of resources.

The public and private forests all need to be carefully guarded, and men must be trained for this work. Scientific forestry must be promoted. It is a profession that offers great opportunities to young men.

Problems and review questions. 1. What portions of the United States were originally forested? 2. Why were there no forests in the other parts? 3. How have the forest trees been used? 4. How have the timber resources been wasted? 5. Where are the chief lumber-producing regions to-day?

6. How may we plan to have a sufficient permanent supply of lumber in this country? 7. Why is it very important that we maintain forests in the United States? 8. State some of the problems that scientific forestry may solve.

Home work. 1. Find out the retail price of one thousand feet of pine lumber. 2. What kinds of trees grow in your home region? 3. How are wood substitutes used in your home city?

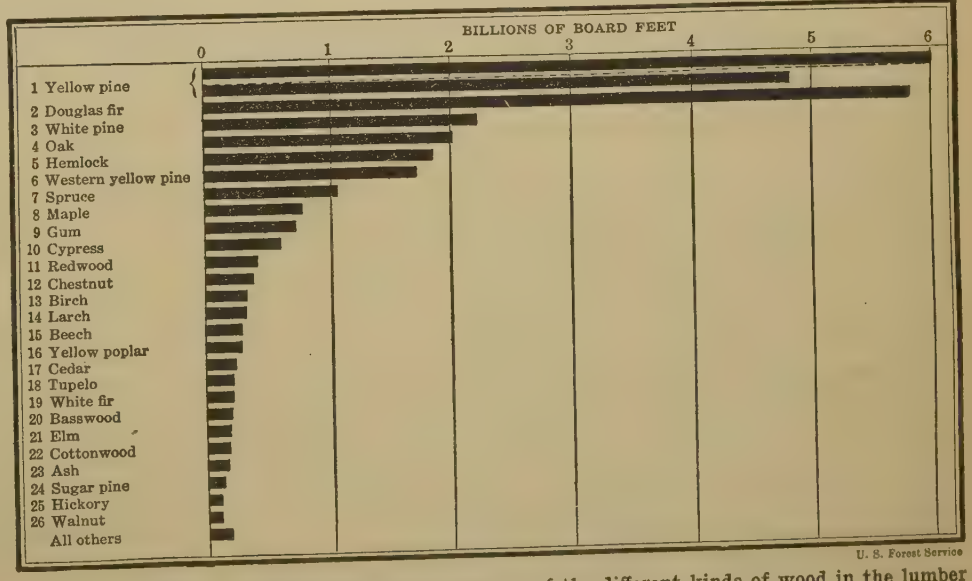

Fig. 560. This table shows the order of importance of the different kinds of wood in the lumber production of the United States. Which of these kinds of trees are hard woods? Which are soft woods? Which of the two, hard woods or soft woods, furnish the larger part of our lumber supply? Great quantities of soft wood are used to make wood pulp for the paper-manufacturing industry

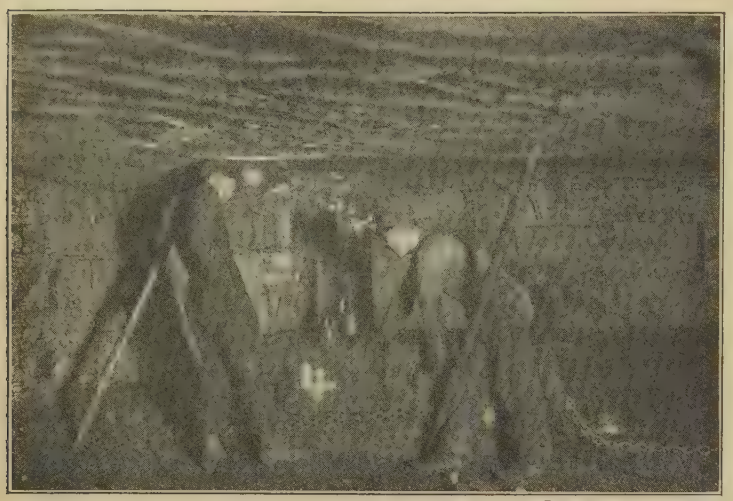

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Fig. 561. These two miners are using an electric coal-mining machine. This machine makes a deep cut under the layers of coal, which loosens them from the mass beneath. Then a small charge of powder is set off, causing the coal to fall. By using this machine two men can do the work of twelve

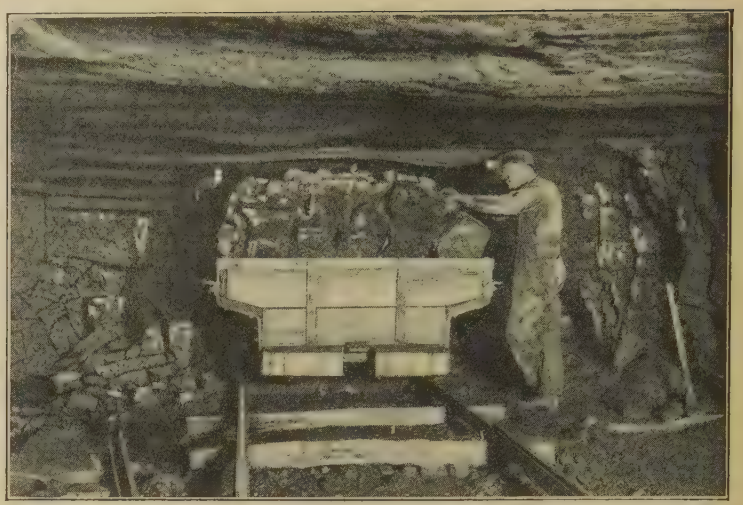

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Fig. 562. The next step in the mining process is to load the coal on the little cars which are run along the galleries and hoisted to the surface. On the car the miner hangs a metal check bearing his number. When the car reaches the surface, the coal is weighed and the amount is credited to the miner

MINERAL RESOURCES

Fuels

The chief natural fuels other than wood are coal, oil, and gas. These resources are stored in the ground. They were a very long time in forming, and when used they are gone forever.

The origin of coal. Coal is made of vegetable matter. Wherever we find a layer of coal to-day, we may imagine there was once a swamp forest. There vegetable material accumulated for thousands of years. The water of the swamp kept the air from reaching the plant material and thus prevented decay. Later that region sank and the sea came in and flooded the area.

Sands, gravels, and clays were washed into that sea and in settling to the bottom buried the vegetable matter. More and more sediments were deposited until the vegetable matter was under a great weight. In many places the cover was hundreds of feet thick, and in some places it was thousands of feet thick. In time, by compression and by the loss of water and gases, the vegetable matter was changed into coal. All stages in this process are known, and samples that illustrate each stage have been found, from the peat in the bog to the coal as it is mined. Exhibits of these materials have been placed in the large museums.

In some regions, where mountains have been made by the folding of rocks, layers of soft coal have been so compressed that they were changed into hard coal. This is the explanation of the anthracite in the Appalachian Mountains of northeastern Pennsylvania.

The supply of coal. The United States is the richest of all the nations in the world in coal. There is more coal in this country than in all of Europe. China is probably our nearest rival in coal supply. We are fortunate not only in the immense supply but in the widespread distribution of the coal beds (Fig. 563).

The anthracite of northeastern Pennsylvania is not surpassed by any coal in the world, and the great Appalachian soft-coal field, which stretches from northern Pennsylvania to northern Alabama, contains the finest bituminous coal lands in the world.

The eastern interior coal field of Illinois, Indiana, and Kentucky is second only to the Appalachian field in the quality of its soft coal. This field is of very great importance to industrial and commercial development in the Mississippi Valley states.

Coal beds underlie much of Iowa and extend southward through Missouri, Kansas, and Oklahoma and into Arkansas. Texas and the Dakotas contain extensive beds of coal that are coming more and more into use. The Rocky Mountains states contain a large supply of coal, and a portion of the coal in Colorado is of anthracite grade.

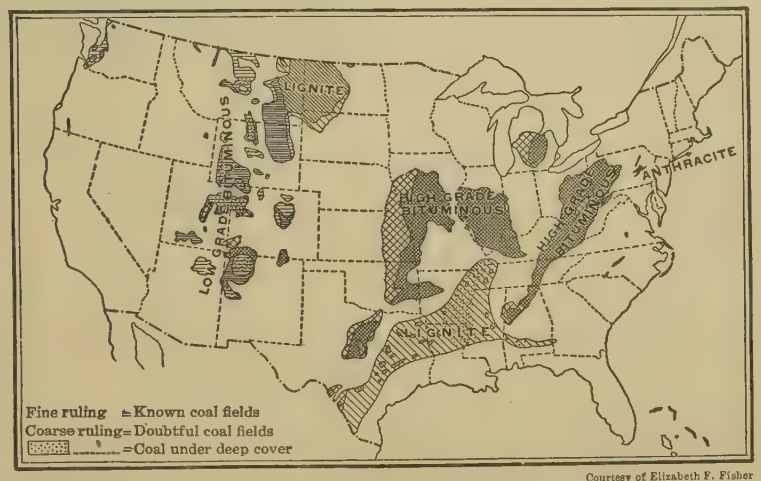
The western plateau states and the Pacific coast states are not well supplied with coal, but the discovery of oil in southern California has, for the present at least, furnished the western part of our country with an abundance of fuel. The chief coal fields in the Pacific coast states are near Tacoma. There large quantities of coal are mined each year, and Tacoma has become an important coaling station for vessels. Many of the coal fields in the western half of the country are owned by the government. They may be leased by individuals, or companies, that wish to develop them.

Alaska contains several coal fields. There are large supplies of anthracite and bituminous coals and vast areas underlain with a low grade of coal called lignite. Some day Alaskan coal will be shipped to the western states and used in steamers on the Pacific Ocean.

The use of coal. To-day most of our locomotives and most of the vessels at sea are coal-driven. In almost all of our factories coal is used to generate steam. Our modern travel, manufacturing, and transportation of goods would be paralyzed if we could not use coal. Many of our cities and homes would be dark at night, and when winter came there would certainly be great suffering in the world if we were suddenly deprived of coal.

The people of the United States use more coal than any other people in the world. It is estimated that we now consume, on the average, over five tons per person each year. The rate at which the amount used has increased is amazing; and unless that rate is lowered, our vast supplies of coal will not last but a few hundred years. But that rate must not go on increasing so rapidly. By properly conserving our coal it may be made to last for thousands of years.

In spite of the immense production of coal in the United States, relatively little is exported. Canada buys more coal from us than any other country. Small quantities of coal are sold to Cuba and other islands of the West Indies and to Mexico. Coal is shipped from Norfolk, Virginia, to Tampico for use on the Mexican railroads and at the Mexican mines.



Courtesy of Elizabeth F. Fisher

Fig. 563. This map shows the location of the coal beds in the United States. What states have large supplies of coal? What states have no coal? How does the coal in the Rocky Mountains differ from the coal in the Appalachian Highlands? The coal under deep cover is buried too far in the earth to be mined with profit

The conservation of coal. There are various ways in which we can make our supply of coal last longer.

1. Prevent loss in mining. It was estimated that in the days before we appreciated the importance of conserving coal as much was wasted as was used each year. That was a tremendous and a disgraceful loss, but it is being corrected.

2. Make little bricks, called *briquettes*, of coal dust. Tar may be used to bind the very fine coal and coal dust together.

3. Save by-products. In making coke it is possible by modern methods to save the gases that are driven off from the coal and to secure ammonia used in certain fertilizers, tar from which dyes are made, and hundreds of other useful products.

4. Improve methods of burning coal so as to secure more heat from it. This calls for the invention of new kinds of engines, new furnaces, and new stoves.

5. Substitutes for coal may be used. Oil, gas, and water-power are the best substitutes we now have.

6. Each person who uses coal can be careful and thus avoid waste. It is estimated that if each person in the United States who used coal should save one shovelful of coal out of ten, about 50,000,000 tons could be saved each year.

Problems and review questions. 1. What are the three leading mineral fuels? 2. Explain briefly how coal is made. 3. Why are some coals made harder than others? 4. Where are the best coal fields in the United States? 5. Which of all the nations in the world has the most coal?

6. Describe some of the things that would happen if we were suddenly prevented from using coal. 7. What are the best substitutes for coal? 8. How may our supply of coal be conserved? 9. Why should the coal be conserved?

Home work. Find out from what fields most of the coal used in your home town comes.

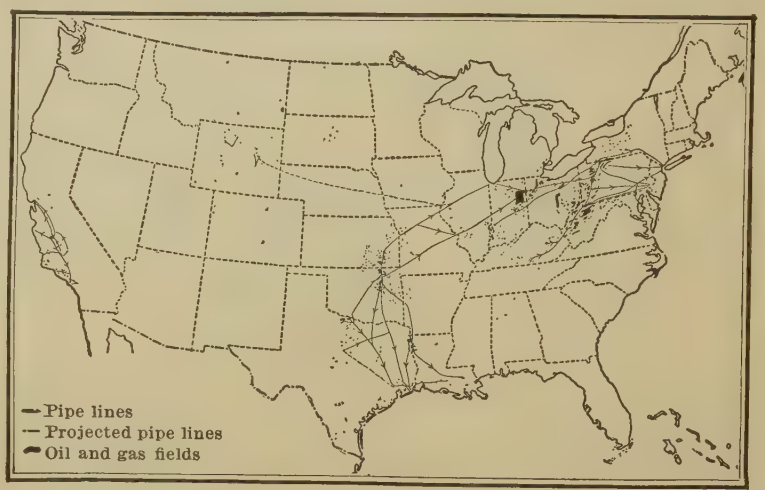
Natural oils and gases. The origin of the natural oils and gases in the ground is somewhat of a mystery. We do not know just how they were made, but most scientists agree that they must have come from the vegetable or animal matter that was buried in rocks. It is certain that large numbers of plants and animals were buried while the sediments that make the sandstones, shales, and other rocks were being deposited in lakes or inland seas. It is certain that the plants and the bodies of animals contain the elements necessary to form our natural oils and gases. It is difficult, however, to discover just how the change took place.

We are certain that the process of making the oils and gases went on deep in the earth and where the pressure was great and the temperature higher than near the surface. These changes must have taken a very long time, probably millions of years. More oil and gas may be forming to-day, but we are using up these valuable resources many times faster than they are being formed. They are resources that can be used but once.

The natural oils and gases are commonly found together in the ground, and with them there is often some salt water. The gas is the lightest and is nearest the surface of the earth; then comes the oil; and below the oil is the salt water. When a well is driven, gas commonly comes off first, then oil, and later the salt water.

Distribution of oils and gases. The map shown in Fig. 564 gives the location of the chief fields where the natural oils and gases are obtained. The first discoveries were made in western Pennsylvania. That field extends southward into West Virginia and northward into New York. The Ohio-Indiana field has been a great producer of these valuable fuels, and Kentucky and southern Illinois have also yielded large quantities of oil and gas. Louisiana has rich supplies of these fuels, California has produced and is producing large quantities, and the late development in Kansas, Oklahoma, and Texas has been marvelous. Successful oil wells are located in Wyoming and Colorado, and additional discoveries are reported every few years from many different parts of the country.

A remarkable experience in this country has been the discovery of new fields as fast as the old fields were nearing exhaustion. It stands to reason that this cannot go on forever, and therefore we must face the problem of conserving our supplies of oils and gases.



Courtesy of Elizabeth F. Fisher

Fig. 564. This map shows the location of the oil and gas fields in the United States. What natural regions produce the largest quantities of oil and gas? Notice the pipe lines. Along these lines pipes are laid underground through which the oil is sent from the fields to the places where it is used or refined

Uses of oil. Natural oil, or petroleum in a crude state (that is, just as it comes from the ground), is used as a fuel. In some portions of the country where coal is not abundant oil-burning locomotives are used. Many ocean liners and ships of war are equipped with oil-burning engines.

Most of our lubricating oils come from petroleum. They are absolutely essential in the running of machinery, and therefore our manufacturing industries are dependent upon this natural resource.

Kerosene is obtained from petroleum, and it is commonly used throughout the world for light. American kerosene is shipped to almost every country. It reaches Greenland and New Zealand and goes far into the interior of China, to places where few, if any, white men have ever gone. It is distributed more widely than any other product from America.

Gasoline, which is now used to drive automobiles, motor trucks, motor boats, submarines, and aëroplanes, is obtained from natural oil.

Naphtha, benzine, paraffin, and vaseline are among the many other useful by-products obtained from petroleum. A large part of the paraffin that is obtained from petroleum is used in the manufacture of common candles.

Conservation of oil. As in the use of wood and coal, we have been very extravagant in the use of natural oil. Those engaged in producing the oil have been guilty of wasting large quantities by letting it run away or allowing free evaporation from open storage tanks. This should be corrected (Fig. 565).

The lighter oils can be taken from the crude petroleum before it is used as a fuel. That will save very valuable products. Where water-power is abundant, electricity could be generated and used in many ways instead of oil. Individuals can always be careful not to waste oil, gasoline, or any of the products that come from petroleum.

Use and conservation of gas. Natural gas is the best of all the fuels. It is used near the producing fields in western Pennsylvania, southern Ohio, Indiana, Kansas, Texas, and Illinois. Many people use it for cooking and for lighting and heating their homes.

Although natural gas is so valuable a fuel and so limited in amount, no other natural resource has been so recklessly wasted by the American people. In many cases, when wells were driven for oil, large quantities of gas came pouring out into the air, and no effort was made to prevent this or to save the gas. Sometimes the gas was lighted and burned for years as great torches. This was a most inexcusable waste. These great torches burned day and night, and it seems strange that they did not awaken the American people to the wisdom of conservation. It has been stated by one state officer in this country that the amount of natural gas lost in his state during twenty years was equivalent to throwing away forty-five tons of coal every minute.

At best the supply of natural gas will not last many years. It is nearly exhausted in many of the fields now, and every means should be taken to conserve what is left.

Problems and review questions. 1. What is probably the origin of the natural oils and gases? 2. Where are the chief oil and gas fields in the United States? 3. What products that come from petroleum have you seen? What are they used for?

4. In what ways is petroleum transported from the wells to the refineries? 5. How may the supply of natural oil be conserved? 6. Of all the natural fuels, which is the best? Why? 7. How are natural gases lost or wasted?

Home work. 1. Find out how a deep oil well is made. 2. What oil field is nearest your home?

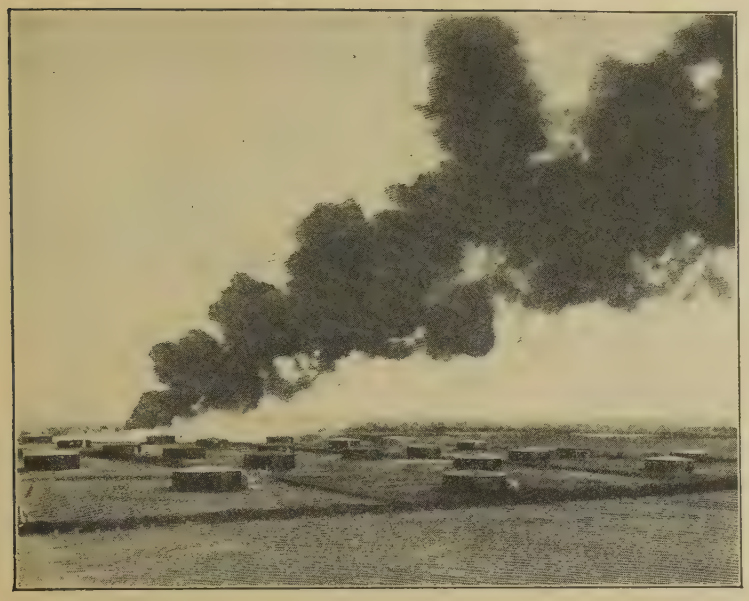


Fig. 565. This view shows a number of petroleum-storage tanks. They are located in a field not far from the wells where the oil is produced. One of the tanks has been struck by lightning, and the oil is burning. This is one of the ways in which petroleum is wasted

Iron

Iron is the most important of all our metal resources. It is not the highest-priced metal, but because of its abundance and great usefulness it ranks first in importance. There is a little iron in most soils, in most rocks, and in most of the waters that flow through the ground. In many places near the surface of the earth there are large deposits of iron, and where that iron can be mined at a profit it is called iron ore (Fig. 566).

Distribution of iron ore in the United States. In this country the region that produces by far the greatest amount of iron ore each year is near Lake Superior. There the ore is of high grade and can be mined very easily. The surface covering of glacial soils and subsoils is removed, and the ore is then taken out by steam shovels, just as great excavations are made. This rich ore is loaded on lake steamers that take it to the leading industrial centers on the Great Lakes (Figs. 567, 568). Much of it is taken to Chicago, Gary, Detroit, Cleveland, Erie, and Buffalo. Large quantities are reshipped from Lake Erie ports to the Pittsburgh district and to points farther east.

It is cheaper to ship the ore to the coal than to send the coal to the place where the ore is mined, for it takes nearly two tons of coal to make a ton of iron. Furthermore, the manufacturing centers that are near the coal fields are leading markets for the iron when it has been made.

The Appalachian iron fields are next to the Lake Superior district in importance. There the iron ores have been found in several localities from northern Pennsylvania to northern Alabama. The iron and steel industries were first established in Pittsburgh, and as the better ores in that district were exhausted Lake Superior ores were imported. The Pittsburgh district is still the leader in the production of iron and steel, but the cities on the Great Lakes have been rapidly increasing their production of these articles. At Gary in northern Indiana the United States Steel Corporation has constructed the largest steel plant in the world.

In the Birmingham district of northern Alabama iron ore, coal, and limestone are by good fortune found close together. The coal and limestone are both used in making iron. Here there are no heavy transportation expenses, and the Birmingham region is becoming a strong rival of the region about Pittsburgh. It is the center of the iron and steel industries of the South, and it is certain to increase in importance as manufacturing is promoted in the Southern states.

Iron ore is mined in the Adirondack Mountains of New York and in a few places in the western part of the United States (Fig. 566).

Importation of iron ore. Although we have great stores of iron ore in this country, we import large quantities of iron ore each year. The mixing of certain ores has been found to produce qualities in steel that are suitable for special purposes. Foreign ores are now being brought to our eastern ports, and especially to Baltimore and Philadelphia. Most of the imported iron ore comes from Cuba, and some comes from Newfoundland, Sweden, Spain, and the island of Elba. We are expecting iron ores from Chile, for Americans have recently purchased ore properties in that country. The Brazilian Highlands contain remarkably rich deposits of iron. American capital has been invested in these deposits, and some day iron ore may be shipped from Brazil to the United States.

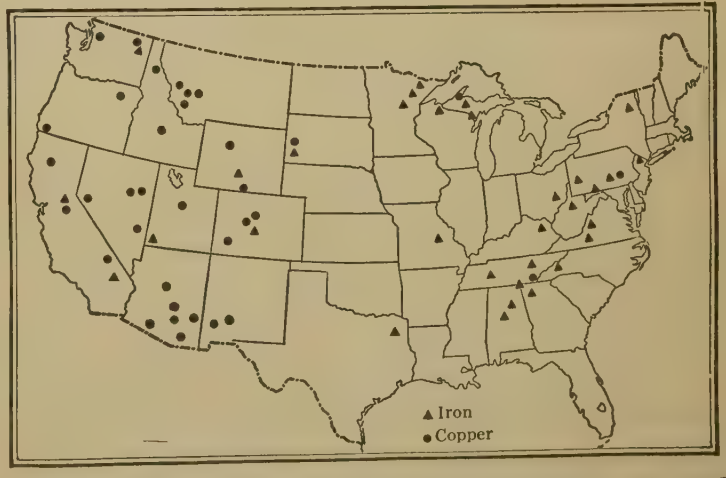


Fig. 566. This map shows the distribution of the chief deposits of iron and copper in the United States. Where are most of the iron deposits? Where are most of the copper deposits? The dot on the south shore of Lake Superior and the one in Tennessee represent very important supplies of copper

Fig. 567. The boat in this view is a Great Lakes freighter which has come from Lake Superior to Cleveland loaded with iron ore. It has anchored at one of the railroad wharves, where the ore is being unloaded and transferred to freight cars by means of a number of powerful unloaders operated by electricity. In what cities may this iron ore be used?

Iron in world trade. The United States and Great Britain are the two leading nations in the iron and steel industries. They now produce more than half of the world's supply of iron. France, Germany, Belgium, and Russia come next in importance.

In addition to the iron ore these industries require many laborers, much capital, good transportation facilities, and a large market. Deposits of iron are widely distributed throughout the world (*see Appendix, p. v*), but only a few countries can yet develop the iron and steel industries on a large scale.

Rails, bridges, girders and pipes, plows, mowers, reapers, farm tractors, windmills, and hundreds of other American articles made wholly or in part of iron or steel are in use in the most distant countries of the world. American rails are used on the railroad to the African lakes in Uganda; they are also used in Manchuria, in Japan, and on the roads that cross the Andes Mountains in South America. The trade in iron is world-wide.

The better grades of iron ore will be used first, and then the vast supplies of lower-grade deposits of iron will be needed. The amount of iron in the world is very great, and as yet but a small fraction of the total supply has been used.

Conservation of iron. The problem of conserving iron is quite different from that of conserving coal, oil, or gas. Iron may be used several times, but coal, oil, and gas can be used but once. The iron-mining companies realize the value of the ore, and therefore are not likely to waste it in mining. The conserving of our iron will be chiefly accomplished by saving that which has been produced. Our chief problem is to prevent the rusting of iron or steel. This may be done by using paint or a coating of zinc or tin. Iron coated with zinc we call galvanized iron, and iron coated with tin is called tin plate. Sometimes expensive pieces of iron are covered with enamel or coated with lacquers or japans. The steel frames of large city buildings are protected with stone, brick, or terra cotta.

Problems and review questions. 1. Where are the chief iron-mining regions in the United States? 2. Name five important industrial centers where iron and steel are made. 3. Why do we import iron ores? 4. Where do our imported iron ores come from? 5. What nations lead in the iron and steel industries? 6. Why do so few small nations develop iron and steel industries? 7. What are some of the American iron and steel products that are sent to distant parts of the world? 8. How does the problem of conserving iron differ from that of conserving coal?

Home work. 1. Find out why limestone and coal are placed in the furnace with the iron ore in making iron. 2. Find out all you can about what actually takes place when iron rusts.

Copper

Our copper comes chiefly from Arizona, Montana, Michigan, Utah, New Mexico, and Nevada. The United States produces far more copper than any other nation. Arizona and Montana produce about one third of the world's copper each year. Arizona alone furnishes over 40 per cent of the yearly output of the United States.

In the Michigan mines, which are located on the south shore of Lake Superior, the ore is in the form of pure metallic copper. This is very uncommon, for copper is usually found with other minerals.

The mines in the upper peninsula of Michigan were for a long time the greatest producers of copper in the

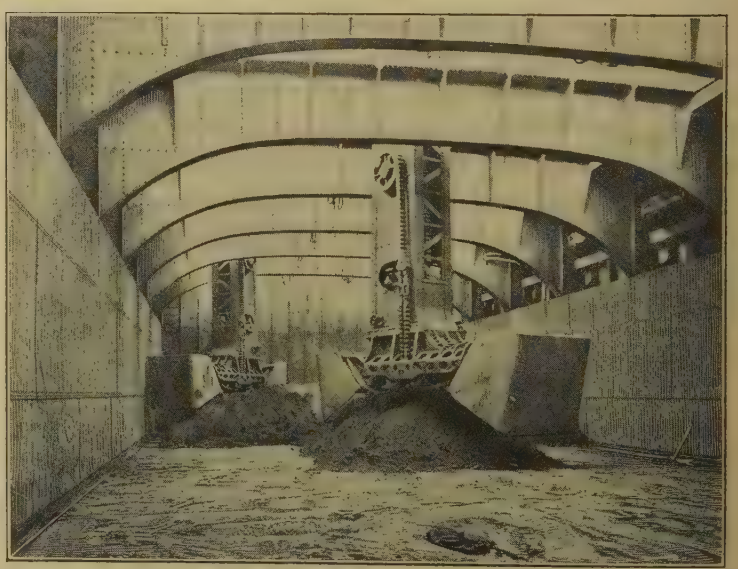


Fig. 568. This is a view in the hold of a freighter which is being loaded with iron ore. Notice the two great buckets which have just opened and dropped their contents into the ship. These buckets are part of the machinery for loading and unloading which you can see at a distance in Fig. 567

Fig. 569. This large copper and zinc smelter is located at Great Falls, Montana. At the left is the Missouri River, which has just come from the Rocky Mountains and has started on its long journey across the plains to join the Mississippi. The water-power at the falls is utilized to generate electricity that is used in many parts of this great plant. To this smelter are brought train-loads of ores that have been mined in the mountains. Some of these ores are crushed and washed, and some must be roasted. The large chimney located on the hilltop is connected with the main part of the plant

world. Some of these mines are a mile deep, and the copper is not yet exhausted. After a while the mines at Butte, Montana, surpassed the Michigan mines in the production of copper, and then the mines in Arizona took first place. There are rich supplies of copper in Alaska, and several million dollars' worth of copper has already been sent from Alaska to the Western states.

In the Rocky Mountain and Plateau states the copper is commonly found with silver, lead, and zinc, and sometimes with gold. Many of the copper ores contain sulphur. When the different metals occur together or the ore contains other elements, such as sulphur, it is necessary to use heat and to invent mechanical and sometimes chemical ways for securing the pure metals. Many ores are first roasted to drive off impurities. Then they are put into great furnaces and melted, and the metals are drawn off and allowed to cool in small molds. Some ores are crushed to a powder and then washed to separate the lighter and useless rock material from the metals before they are roasted and sent to the furnaces to be melted. The sulphur gas driven off from the copper ores is used in making sulphuric acid (Fig. 569).

Fig. 570. This is a view in the manufacturing plant of a great electric company at Schenectady, New York. There are many other such electrical plants in different parts of our country, where all kinds of machinery for generating and transmitting electricity are made. The use of copper wire in transmitting electricity has made possible the widespread use of electric power

Finally, when the different metals have been separated and pure metallic copper has been secured, it is shipped to industrial centers in this country or in foreign lands.

Uses of copper. Copper ranks next to iron in usefulness to man. It makes possible our electric lights, telephone, telegraph, electric engines, and electric-car lines, and the distribution of electricity from the power plants (Fig. 570). Copper is used in the manufacture of boilers, lamps, and many other useful articles for the home. Brass is made by combining copper with zinc, and a kind of bronze is made by combining copper and tin.

Importation of copper ore. Although we mine more copper in this country each year than is mined in any other country, we import large quantities of copper ore. The imported ore comes chiefly from Labrador, Newfoundland, Spain, Italy, Peru, Cuba, and Canada. It is brought to this country largely because of the coal available, which is used in extracting the metal from the ore. The cost of importing the ore is usually rather small, for many of the vessels returning from those countries find it difficult to secure full cargoes, and therefore give a low rate on the copper ore.

Conservation of copper. This metal is so valuable that few if any people need to be told to save it. The miners are careful of the ore, and those who purchase the pure metal try to prevent any waste. The amount of copper in the world is limited, and the production cannot, therefore, continue on the same basis indefinitely. It is perfectly reasonable to expect that the amount produced in the world each year will decrease. Our chief duty is to prevent the destruction of the copper already produced. It can be used over and over again. The world will not need to go on producing such large quantities as it now produces if the copper already in use is kept in use.

New methods of mining, new methods of extracting the metals from the ores to make profitable the use of lower-grade ores, and the discovery of more copper ore may help out the supply of copper for the future.

Fig. 571. This map shows the distribution of the chief deposits of lead and zinc in the United States. What states in the Rocky Mountain region contain important deposits of lead or zinc? What minerals are found in southwestern South Dakota? *See Figs. 566 and 575*

Problems and review questions. 1. What states produce large quantities of copper? 2. In what state is pure metallic copper found in large quantities in the ground? 3. Which one of our distant possessions contains, and furnishes each year, large supplies of copper? 4. Where do we rank with the other nations of the world in the production of this metal? 5. Name all the ways you can in which copper is used. 6. Why is copper ore imported into the United States? 7. From what countries does it come? 8. Discuss the problem of the conservation of copper. 9. Where may we expect new discoveries of copper ore to be made in the United States? *See Fig. 566.*

Lead and Zinc

Lead and zinc are also very useful and therefore very valuable metals. They are found deep in the earth in mineral veins and very commonly occur together. In places these minerals form beautiful crystal linings to small cavities in the rocks. In other places they fill cracks, or fissures. Sometimes the fissure becomes so narrow and the supply of ore so small that the miners barely get enough to pay them for their work. Then, as they dig on through the rocks, the crack, or fissure, in which the ores are found may become larger, and the miners may find, deep under the ground, large supplies of these valuable minerals.

The ores of lead and zinc usually contain sulphur, and that makes it necessary to roast them so as to drive off the sulphur. The sulphur gas is captured and used in making sulphuric acid.

Lead and zinc deposits have been discovered in many of the states. Missouri, Idaho, Utah, and Colorado produce large quantities of lead, and Missouri, Montana, New Jersey, and Colorado (in the order given) lead in the production of zinc. Missouri produces much more lead and zinc than any other state. Southwestern Missouri, northwestern Arkansas, and northeastern Oklahoma form one of the chief producing areas in this country. There is another lead and zinc mining district in southwestern Wisconsin and northwestern Illinois (Fig. 571).

In the Rocky Mountain states the lead and zinc occur with ores of copper, silver, and gold.

Uses and conservation of lead. More than half the lead produced in the United States is used in the manufacture of paint. It is an excellent substance to have in paint, but satisfactory substitutes should be found, and lead should be used in ways that permit it to be used over and over again (Fig. 572). Lead pipes are sometimes used in our plumbing, but iron pipes are now more common. Type metal contains some lead, but the type may be remelted and the metal used again.

Uses and conservation of zinc. This metal is most commonly used to galvanize iron. The zinc covering prevents the air and moisture from reaching the iron and causing it to rust. In this way zinc is helping in the great problems of conservation. It is helping to preserve a more valuable metal. Zinc, as was mentioned under *copper*, is used in making brass, and sheets of zinc are often placed beneath or behind stoves as a protection against fire. Zinc is also used in making paint.

The conservation of lead and zinc will depend chiefly upon preventing loss in mining, improving methods of extracting the metals from the ores, preventing waste, and finding substitutes. Additional supplies of the ores may from time to time be discovered.

Problems and review questions. 1. Where are the chief supplies of lead and zinc ore in the United States? 2. What articles have you seen that were made of lead? of zinc? 3. What ways can you suggest for conserving the present supplies of lead and zinc?

Fig. 572. The men in this picture are workers in a mill where lead paints are manufactured. This is the room where the materials of which the paint is made are ground and mixed. Why is it wasteful to use lead in paint-making? What could be done to prevent this waste?

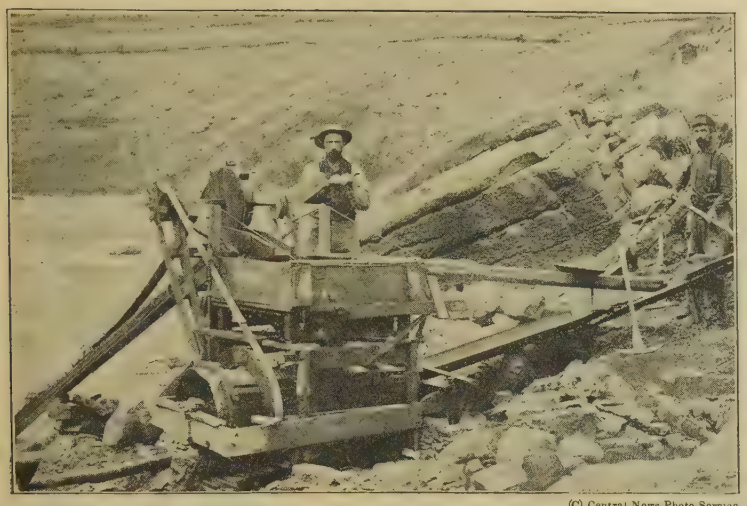


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Fig. 573. Years ago, when men first discovered that gold could be washed from the stream gravels in our Western states, they invented clumsy wooden machinery to help them in their work. This view shows one of these early machines, which was operated very simply by the turning of a wooden handle

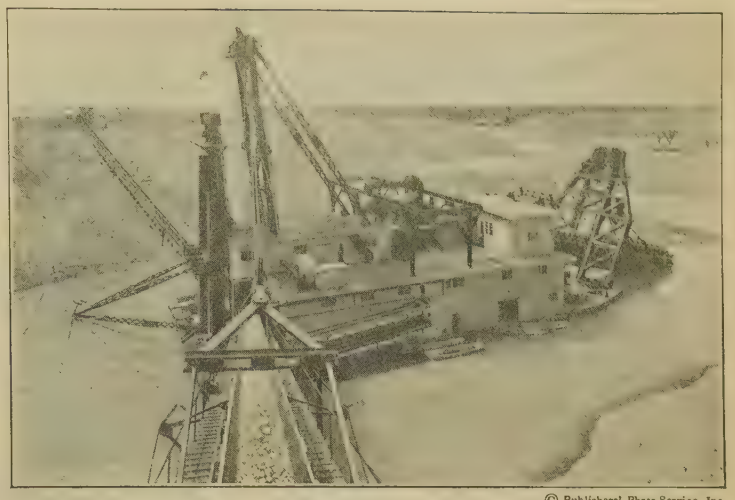

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Fig. 574. To-day placer mining (the name given to the method of obtaining gold or other ores by washing them from stream gravels) is carried on by means of dredges operated by electricity. The dredge in this view is digging out the gold-bearing gravels from the bottom of a river in California

Gold and Silver

The ores of gold and silver are usually found together. They are commonly associated in the ground with lead, zinc, and copper. Gold and silver are called precious metals. They are very valuable, chiefly because of their beauty.

Most of the gold produced in the United States comes from the mountain, or plateau, states in the western part of the country. California, Colorado, and Nevada each produce large quantities of gold. South Dakota also ranks high in the production of gold. The gold mines in South Dakota are in the Black Hills, which are a part of the Rocky Mountains (Fig. 575).

Since 1900 Alaska has been producing large quantities of gold each year. Much of this gold is obtained from stream gravels, just as it was in the early days of most of the gold-mining camps (Figs. 573, 574).

At Nome, Alaska, millions of dollars' worth of gold have been taken from the sands and gravels of the present beach and from old beach lines that the miners have found several miles inland.

The United States does not lead the world in the production of gold. South Africa has first place, and United States is second.

Montana, Utah, Idaho, Nevada, and Arizona lead in the production of silver, the first place being held by one or another of these states each year. The United States produces much more silver than any other nation. Mexico ranks second, Canada is third, and then comes Peru. The four nations that lead in the production of silver are in the Western Hemisphere. The fifth place is held by Japan.

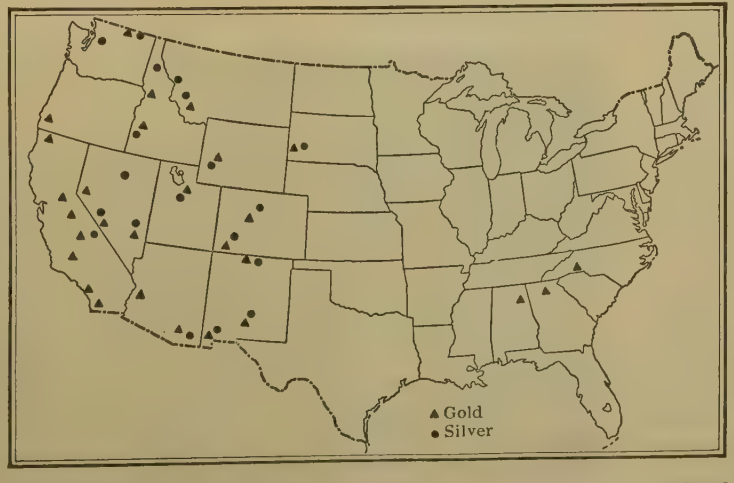

Fig. 575. This map shows the distribution of the chief deposits of gold and silver in the United States. In which of the natural regions of the United States are most of these deposits located? What states are known to contain gold? What states contain silver? In what hills are the gold and silver deposits of South Dakota?

Uses of gold. The chief use of gold is in making coins, but large quantities are used in the manufacture of jewelry and ornaments. Gold is a soft metal, and often a small amount of copper is mixed with it when they are both in a molten condition. The copper adds hardness, and the combined metals last much longer than would the gold alone.

Uses of silver. Silver was formerly very important in making coins, but now it is much less used for that purpose. Tableware, jewelry, and many utensils are made of silver.

Conservation of gold and silver. The conservation of these precious metals can best be accomplished by preventing waste in mining, by improving methods of extracting the metals from the ores, and by using the metals over and over. There are good chances that other discoveries of valuable ores may be made and that scientists may invent cheaper ways of treating the ores, so that in the future poorer ores may be mined at a profit.

Building Materials other than Wood

In addition to the very valuable metals found in the ground, man has discovered other substances that are perhaps equally useful.

Sands and gravels are so widely distributed in the United States that almost every community has a local supply. These materials are commonly used together in building roads and in making concrete. Sand is used in making plaster and in the manufacture of glass, bricks, sandpaper, and special roofing papers.

When sand is blown by the winds against wood or stone, it cuts the surfaces wherever it hits. When men wish to remove paint from iron or steel structures, sand is sometimes blown against the metal surfaces by compressed air, making an artificial sand blast which will cut off the paint. A sand blast is also used in making ground glass, and sands are placed in large artificial water filters. It takes but a few minutes of thought to realize that these materials are very valuable.

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Fig. 576. This view shows a great cement block being lowered into place as a part of the foundation for a wharf. Cement is one of the most widely used building materials to-day

Clays and certain soft rocks that can be crushed to clays are also widely distributed in this country. Almost every community has some clay available. The clays have made possible the manufacture of tile, terra cotta, pottery, washbowls, sinks, doorknobs, many different kinds of bricks, and hundreds of other useful articles.

Limestone occurs in almost every state in the Union. It is a building stone, a source of lime, and, when crushed, an excellent material to use in concrete construction. Certain limestones are used in making cement (Fig. 576).

Home work. 1. Find out how concrete is made. 2. What uses are made of concrete near your home? 3. Find out how lime is obtained from limestone.

Sandstones are used in building, and some varieties are crushed and used in making glass. Certain kinds of bricks are made largely of sand obtained by crushing sandstone.

Granite that is suitable for building purposes and as ornamental stone is found chiefly in the Appalachian Highlands. New England furnishes most of the granite used in this country (Fig. 577); the next largest supply comes from the southern division of the Appalachian Highlands in Maryland, North Carolina, and Georgia. Texas also furnishes granite.

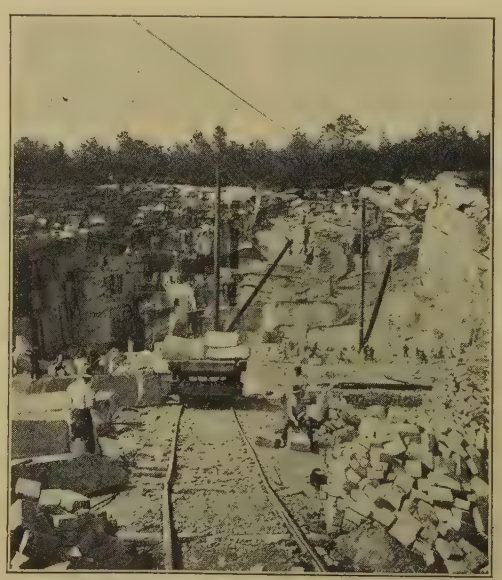

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Fig. 577. This is one of the quarries which have given New Hampshire its name of "The Granite State." What natural region furnishes most of the supply of granite in the United States?

Granite contains many beautiful crystals of different shapes and colors. These crystals formed when the rock was cooling from a molten condition below the surface of the earth. Later, when the covering was worn away, the granite was left at the surface where man could make use of it.

Slate is quarried chiefly in Maine, Vermont, New Jersey, Pennsylvania, Maryland, Georgia, and Virginia. Some slate is produced in Minnesota, California, and Arkansas. It is a very useful stone. We may know it best as a roofing material, but it is used for billiard-table tops, school blackboards, school slates, slate pencils, washtubs, and many other things.

Marble is another very useful stone. It is used chiefly for ornamental purposes. Vermont produces more marble than any other state, and yet large quantities of marble are quarried in Massachusetts, New York, Maryland, Georgia, and Tennessee. Colorado has a large supply of marble, and Texas and California produce some marble each year.

The conservation of building materials. The formation of our building stones and of clays, sands, and gravels has taken millions of years. There appears to be an abundance of these materials in the United States, and yet it is in the true spirit of conservation to prevent their waste or destruction. When stones have been cut and trimmed, when clays have been made into useful articles, and when sand and gravels have been assorted and made available for man's use, they represent a certain investment of human energy. We should remember that it is important to conserve not only raw materials but manufactured articles, and the structures that men have erected should be constantly kept in repair in order to preserve their usefulness.

Problems and review questions. 1. Name at least five natural resources that are found in the ground and are not metals. 2. In what ways are sands used? 3. What industries are dependent upon clays?

4. What building materials other than wood may be used in regions where there are no firm, hard stones that can be quarried? 5. What stones are most commonly used for ornamental and monumental purposes? 6. What are some of the most common uses of cement?

Home work. 1. Make a list of the kinds of articles in your home that are made of clay. 2. What building stones are used in your home region? Where do they come from?

WATER

Water as a natural resource suggests at once the water supply for our cities and towns; the ground waters that nourish plants and enter the common wells in the country; streams that furnish power and streams that may be used for irrigating lands; navigable rivers, harbors, lakes, and ice.

Water is absolutely necessary to life. One who has never visited a dry region may find difficulty in realizing the importance of water. In arid climates the plants may be separated five, ten, fifteen feet, or more, and yet be crowded. They are as near together as the ground water makes it possible for them to live. Few if any animals can live in such a region.

The trails in a desert or even a semiarid region may be found coming together, and one might expect that he was approaching a settlement, but the trails lead to a water hole or to a spring. That little water hole or spring becomes the stopping place for every wild animal and every man that travels that way across the desert. The wandering people of the desert meet at such watering places and often camp there overnight. In regions where water is abundant we fail to realize what a real luxury it is to those who live where it is scarce (Fig. 578).

Fig. 578. This is a view in the southwestern part of the United States, where there is so little rainfall that the country is a desert. Notice the rippled sand dunes which the wind has piled up. Is there any way in which such a region may be made suitable for the habitation of men?

Fig. 579. The building in the foreground of this view is an electric-power plant in California. The water from the stream is brought to a point on the valley bluff and then allowed to run back to the river through the plant. As it rushes through the building its great force is used to make electricity

Water-power was early used in the establishment of industries in this country. In those days the mills were placed near the water-power sites, and the water-power was used directly to turn the mill wheels. This was especially true in New England. Then there came a demand for power at a distance from the water-power sites, and the steam engine, with cheap coal, was used. Now, with the modern methods of generating and transmitting electricity, the water-power sites have again become very valuable (Fig. 579). Those streams that have falls or rapids in their courses and have a constant or nearly constant flow throughout the year are most serviceable in developing water-power.

The uniform distribution of rainfall helps to make the flow of streams uniform. Lakes, swamps, and marshes serve as reservoirs and control the supply of water to certain streams. The Niagara River, with four of the Great Lakes for reservoirs, has a remarkably even flow of water throughout the year. If those falls are ever completely utilized, they should develop from 5,000,000 to 7,000,000 horse-power day and night. Many of the small lakes in this country serve as natural reservoirs for power-producing streams. Several states have planned artificial reservoirs to help solve the problem of a uniform flow in the streams that are used for power.

Glaciers and snowfields serve as good reservoirs for streams. In the Pacific-coast states, where the rain comes in the winter, the melting of the glaciers and snowfields supplies the streams in the summer. In those states the streams descend through the mountain canyons with many falls and rapids in their courses, and offer wonderful opportunities for the development of water-power.

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Fig. 580. This is one of the boats which carry passengers and freight on the Ohio River. These river boats are built in such a way that they may be used in shallow water and thus can go far up the streams. How far is the Ohio River navigable? Name six navigable rivers in the United States

All the states in the Rocky Mountain region have an abundance of water-power. There electricity, generated at water-power plants, is furnished to private homes, to cities and towns for light and power, to street railways, and even to one of the great transcontinental railroads. In many places the mines are lighted with electricity, and the mills where the ores are crushed are run by electricity.

Streams may be dammed in numerous places and on their way to the sea may be used over and over again to generate power. In the western part of the country many streams that are used in several places to generate power are then diverted to irrigate dry lands.

Where the Mississippi River is dammed at Keokuk, Iowa, the power plant can develop 300,000 horse-power. Many of the tributaries of the Mississippi River have hydroelectric (water-electric) plants located along their courses. Hydroelectric plants have now been built in a great number of the states.

The possibilities of utilizing the waters in our lakes and streams in developing water-power are very great. The tides may some day be used on a large scale to develop power.

The navigable rivers in this country directed the migrations of settlers in the early days. They were the chief highways of travel before railroads were constructed, and to-day they are an important factor in inland commerce. The Mississippi River and its tributaries have about 14,000 miles of navigable waters (Fig. 580).

Canals have been constructed, and the rivers and harbors have been improved. The Barge Canal of New York cost over one hundred million dollars. It connects Buffalo with Troy and has several branches (Fig. 581).

The amount of raw material and of manufactured goods to be transferred increases each year. The railroads have more work than they can do promptly, and the Great Lakes and navigable streams should be used to help solve the problems of transportation in the United States (Fig. 582).

Conservation of water resources. In arid or semiarid regions the conservation of the water is simply the saving of the water. When a field is being irrigated, care should be taken not to use too much water. Overirrigation is a mistake; the land becomes swampy and may be ruined. Each farmer should take no more water from the streams or canals than his fields need. What is left in the stream or canal when it passes one farm may then be used by someone living farther downstream or farther along the route of the irrigation canal.

The canals should be made as nearly as possible watertight. Otherwise the water for irrigation will seep through the walls or banks of the canal and be lost, or perhaps wash away the canal embankment.

In the regions where there is an abundance of water the problem of conservation is largely how to make the most or best use of the water. The individual homes and the villages, towns, and cities must all be supplied with water for domestic purposes. The great industrial plants, the fire departments, and the street-cleaning departments need large supplies of water.

Where power can be developed from falling water it is true conservation to use that power. That means the saving of coal, oil, gas, or wood. Unless we use the water-power, we lose it. In this case the best conservation means the most complete use of a natural resource.

Photograph by Gordon P. Gleason

Fig. 581. One of the most important inland waterways in the United States is the Barge Canal across the state of New York. This view shows one of the locks in the canal. What lake and what river are connected by this canal? What cities are at its eastern and western ends?

Fig. 582. Many of the passenger vessels in use on the Great Lakes are as large as ocean liners. This one runs between Buffalo and Cleveland. The Great Lakes form a wonderful waterway linking the agricultural West with the industrial East. What are the chief ports on the Great Lakes?

In Europe water-power is often spoken of as "white coal," and in many places it has nearly taken the place of black coal. We may look forward to a greater and greater use of the water-power in the United States for generating electricity.

Problems and review questions. 1. What is the source of the water that falls on the land? 2. Some of the rainwater runs off in streams and some sinks into the ground. What becomes of the rest? 3. What are the chief uses of water? 4. In what ways is water-power used?

5. How are lakes helpful in the development of water-power? 6. What parts of this country are especially fortunate in opportunities for developing water-power? 7. Why should our inland navigable waterways be improved? 8. Of what value are lakes except as they serve as reservoirs? 9. Discuss the problem of the conservation of our water resources.

Home work. 1. What is the source of drinking water in your home region? 2. Find out what an artesian well is. 3. Is electricity furnished to farming districts in this country? Where?

FISHERIES

The best fishing region near the United States is off the Atlantic coast from Cape Hatteras to Newfoundland. There the waters are shallow and cool. The Labrador current brings the cold water southward along our northeastern coast and helps to make that one of the three best fishing regions in the world. The shallow waters northwest of Europe and those northeast of Asia are the other two regions.

The cod, haddock, halibut, mackerel, and herring are caught in our northeastern fishing region. The cod is the most valuable of all our fish supplies. A large amount is sold to be eaten fresh, but a much larger quantity is salted. There are many factories in New England, especially in Massachusetts, where cod are cleaned, split, dried, and salted. Mackerel are eaten fresh, and great quantities are salted or canned. The larger herring are smoked or salted, and the smaller ones are canned and sold as sardines.

South of Cape Hatteras there is little fishing, for the Gulf Stream warms the waters near our Atlantic coast, and the fish that are most in demand as food are not found in warm waters.

On the Pacific coast from San Francisco northward to the Yukon River in Alaska are the greatest salmon fisheries in the world. During the season when the salmon are running upstream to spawn, or deposit eggs, millions of them are caught each year in the nets, or seines, that are placed in the rivers for this purpose. Many of the fish are shipped to be eaten fresh, but at each of the fishing stations the greater part of the catch is packed in cans. This is a very busy time at the great fishing stations. Each day great barges of fish are brought from the rivers to the canneries. The fish are carefully cleaned, packed into cans, and cooked. Later each can is inspected several times, and those that are not perfectly air tight are discarded.

The value of the salmon caught in the Alaskan waters each year is nearly as much as the value of the gold produced each year in that territory (Fig. 583). The canned salmon shipped from the United States to other countries is more valuable than any other of our fish exports. In 1916 the salmon exported from the United States brought $15,000,000.

The Great Lakes supply whitefish, lake salmon, lake trout, bass, and perch (Fig. 584). Many of the ponds and lakes of this country are well stocked with fish, and among the mountains the swift, cold streams abound in trout.

Oysters, crabs, clams, and lobsters are really not fish, but they add to the supply of sea food. They are called shellfish because of their hard, limy, outer shells.

Fig. 583. These men are Alaskan salmon fishermen. They are unloading their day's catch of salmon, which will be taken to the cannery close by and put up in tins for export. What foreign countries buy large quantities of American salmon? Why is it necessary to have laws to regulate the fishing in American waters?

In the shallow waters that are not very cold, such as exist from Cape Cod southward to Galveston, and in a few places on the Pacific coast, oysters live and may be raised in abundance. When packed in ice the fresh oysters may be shipped far into the interior of the country, but each year large quantities are canned for shipment. Chesapeake Bay, Delaware Bay, and Long Island Sound are important centers of the oyster business (Fig. 585).

Fig. 584. Many of the people who live along the shores of the lake in western Michigan are engaged in the fishing industry. These men are showing some of the largest fish in their day's catch. Behind them, on the big reels, are their nets. What kinds of fish are caught in the Great Lakes?

Clams bury themselves in the mud near the shore and must be dug up at low tide. Lobsters and crabs are caught in traps. The traps are weighted so that they remain on the bottom. Bait is placed in each trap, and as the lobsters crawl about searching for food many of them find their way into the traps. The lobsters live only in cold waters, and the best lobster fisheries in this country are on the coast of Maine. Crabs live in cold or warm waters and may be caught off the coast from Maine to Texas.

The whale and seal are not fish, and yet we may speak properly of whale fisheries and seal fisheries. In the waters off the Alaskan coast, especially far north in Bering Strait and the Arctic Ocean, whales are captured, and the Pribilof Islands in Bering Sea are the center of the chief seal fisheries in the world. Seals come to those islands each year. The young seals are born there, and they live on the land until they are large enough to swim. Seals are protected by the United States government, but each year a certain number of males are killed for their skins by a company that pays a license fee for that privilege. For years our government could not control the killing of the seals beyond three miles from the islands, and many mothers were shot at sea while out for fish to feed to their young. That meant the death of the young seals also. Now, by a treaty between the United States, Canada, and Japan, the killing of the seals at sea is regulated.

Near the southern end of Florida sponges and large turtles are secured.

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Fig. 585. This is a mound of oyster shells. The oystermen put the old shells back into the water so that the young oysters may attach themselves to them during their growth

Conservation of our fish supplies. Several steps have been taken to conserve our supply of fish. Laws have been passed that make it illegal to take fish under certain sizes from the lakes or streams. When undersized fish are caught, it is the duty of the fishermen to throw them back into the water. A similar law has been passed to prevent the taking of small lobsters from the sea.

There are very strict regulations controlling the catching of salmon. Nets cannot be placed all the way across a stream, and cannot be kept in the streams continuously from week to week. Each day or each week the nets must be raised or opened for a certain length of time, so that some of the fish that are trying to swim upstream to spawn may succeed. Otherwise no salmon eggs would be deposited, and the supply of this very valuable fish would be exhausted in a few years.

The stocking of the streams, lakes, and ponds with young fish is now being carried on by the national government and by many of the state governments. Millions of fish eggs are hatched out, and the young fish are then shipped to streams and lakes where there has been so much fishing as to make this restocking necessary.

In certain of the western states it is illegal to sell mountain trout unless they are raised in a privately owned pond. This law was passed so that fishermen out for sport would not take more than they wanted to eat while in camp.

Problems and review questions. 1. What habits of sea fish help to make it possible for men to catch large numbers of them? 2. How many different methods of catching fish do you know about? 3. Where are the three best fishing regions in the world? 4. Why are the fish abundant in these regions? 5. Where are the following taken in large numbers: cod, salmon, oysters, lobsters, and seals? 6. What means have been employed to maintain a good supply of fish and other useful animals in the sea? 7. Of what use are the various animals in the sea?

Home work. 1. What are some of the regulations in your state regarding fishing? 2. Why are licenses required in some states? 3. Read "The Story of a Salmon," by David Starr Jordan in "Science Sketches."

INDUSTRIES DEPENDENT UPON IMPORTED RAW MATERIALS

It is a striking fact that few American industries are absolutely dependent upon raw materials from foreign lands. To be sure, large quantities of raw materials are imported, and many manufactured articles are brought from other countries to the United States. Much of this imported material, especially articles of clothing and ornaments, is imported to please the fancy of American purchasers. Large quantities of wool and great cargoes of hides and skins are purchased from foreign people and brought to this country to supplement our local supply. We could, however, greatly increase our local supply of wool, hides, and skins if that were necessary. The two great industries that must have raw materials from foreign lands are silk manufacturing and the manufacture of rubber goods.

Silk manufacturing. The United States leads the world in the manufacture of silk. The raw material is produced chiefly in Japan, China, Italy, and France. The mulberry tree is grown in those countries, and the leaves are fed to the silkworms. In each of those countries there is an abundance of cheap labor, and therefore the raw silk is produced at a lower cost than would be possible in this country (Fig. 586).

The cost of transporting the raw silk to the United States is very small, and the conditions for manufacturing here are much better than they are in the lands where the silkworms are raised.

Paterson, New Jersey, is one of the leading centers of the silk industry in this country. In that city the iron works employ the men, but that leaves many of the wives and daughters free to work in the silk mills.

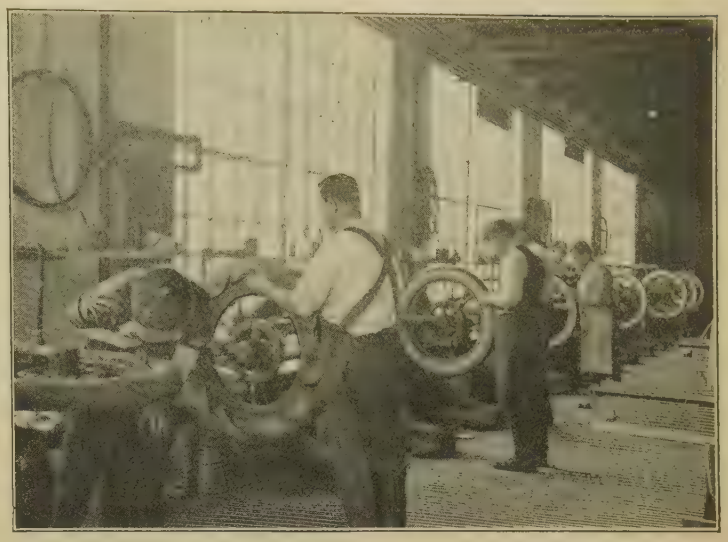

Fig. 587. The manufacture of automobile tires in the United States is increasing every year, and thousands of men are employed in this industry. In addition to the rubber, the making of tires requires large quantities of strong cotton cloth and certain chemical supplies. Which one of these materials is often obtained from foreign countries?

In a silk mill there is very little heavy work, and therefore a great many women and girls are employed. New York and Philadelphia are also important centers of the silk industry.

At Allentown, Pennsylvania, large numbers of men are employed in cement works, and that leaves a number of women available for helping in the manufacture of silk. In the coal-mining towns of Pennsylvania, especially Scranton and Wilkes-Barre, where the men are employed in the mines, silk mills have been established. Pennsylvania now leads in the amount of silk manufactured each year.

Silk fibers are now being produced artificially in France, Germany, Switzerland, England, and the United States. It is a wonderful invention. Chemists have discovered a way to make a jellylike substance from cotton or even from sawdust which, when forced by compressed air through tiny holes in a glass plate, forms very delicate fibers. These fibers are so fine that from ten to twenty must be twisted together to form a single thread.

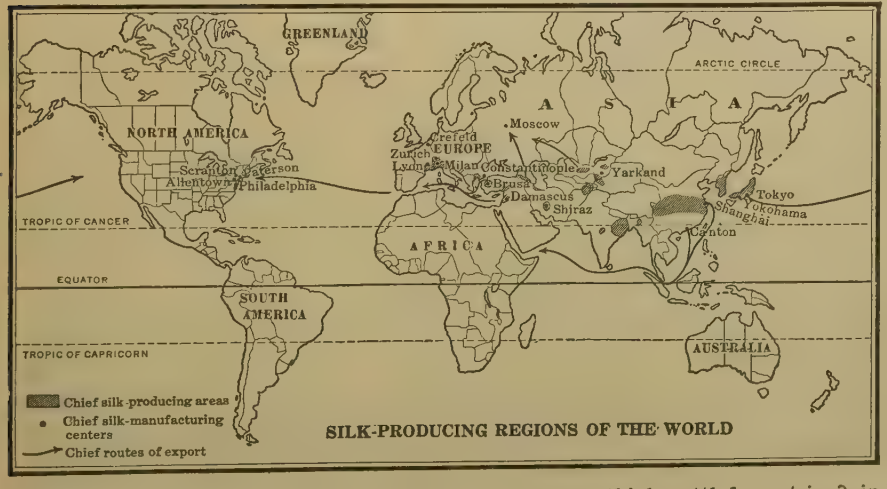

Fig. 586. Is most of the world's silk produced in thickly or thinly settled countries? in cold or warm regions? Why is so much of the raw silk sent to distant lands to be manufactured? Notice that South America, Africa, and Australia neither produce nor manufacture silk. Why are the chief American centers of silk manufacture in the eastern part of the United States rather than in the western part?

The manufacture of rubber goods. The United States leads the world in the production of rubber goods and yet must import the necessary crude rubber from distant lands.

For many years most of our crude rubber came from the tropical forests of the Amazon and the Congo. Within recent years, however, our rubber industry has grown to such an extent that there is not enough forest rubber to supply our needs. To meet the increased

demand for rubber, large areas in the Malay Peninsula, the East Indies, and India have been planted with rubber trees. Plantation rubber now forms the greater part of the total world's supply. We still import crude rubber from South America and Africa, but our greatest supply comes from the plantations of southwestern Asia.

For many years crude rubber was used only to make erasers. In 1823 MacIntosh invented a way to mix sulphur with rubber, and the product which he obtained was used in the manufacture of waterproof clothing, boots, and shoes. In 1842 Goodyear improved those inventions, and since then there has been a rapid increase in the rubber-manufacturing industry in this country and in the countries of western Europe.

Since the invention of rubber tires for bicycles, carriages, and automobiles the demand for more rubber has been enormous. Rubber tubing is used in all civilized lands, and large quantities of rubber are used to cover electric wires and in the manufacture of many useful articles.

It is estimated that the rubber industry in this country requires each year an amount of crude rubber about equal to one pound for every man, woman, and child in the United States.

The manufacture of rubber boots and shoes is centered in southern New England. New England factories also produce rubber tires, but the manufacture of rubber tires is now a very large business, which is carried on in many different centers. Akron, Ohio, is one of the very important producing centers (Fig. 587).

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Fig. 588. This is a view in a hemp mill in the United States where strong ropes and cords are made. In the foreground is the raw hemp. Although the United States produces some hemp, it is not enough to supply the rope factories, and a large amount must be imported. From what countries is hemp obtained?

Problems and review questions. 1. What large industries in the United States are absolutely dependent upon raw materials from foreign lands? 2. Are they the only industries for which raw materials are imported into the United States? 3. How is raw silk produced?

4. From what countries do we import large quantities of raw silk? 5. Why does it not cost much to produce raw silk in those countries? 6. Where are some of the leading centers for the manufacture of silk in this country? Why were the silk factories located in those cities? 7. What parts of the world are the chief producers of crude rubber? 8. Why should the United States take the lead in the manufacture of rubber goods? 9. What Ohio city is especially well known for the production of rubber goods? 10. What inventions have helped develop the rubber industry?

Home work. 1. Make a list of all the articles you know of in which there is rubber. 2. Of what is satin made?

INLAND COMMERCE

With the increase in population and with the spreading of the people from the Atlantic to the Pacific there came the necessity for inland commerce. The settlers in the interior and Far West wished to exchange foodstuffs and precious metals for articles manufactured in the East or imported from abroad. The farms of the Central Plains and the ranches of the Great Plains increased in number and size, and their total output of grains, cattle, sheep, horses, mules, and hogs became enormous.

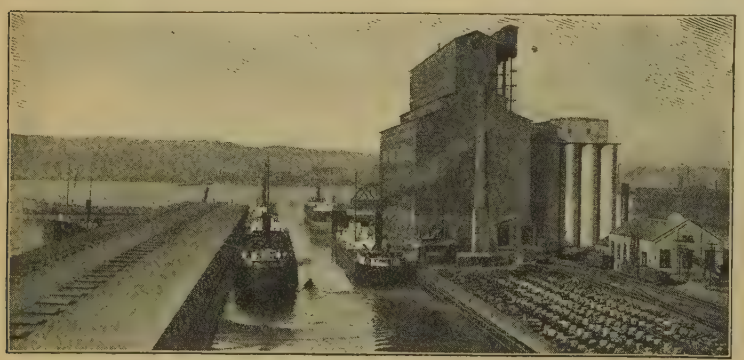

Fig. 589. These lake freighters are being loaded with grain at Superior, Wisconsin. They anchor close to the great elevator, and the grain runs down through pipes directly into their holds. These vessels will carry the grain to the eastern lake ports. Of what will their return cargoes consist?

Trace the route of these freighters on the map between pages 95 and 98

Fig. 590. This train, drawn by an electric locomotive, is crossing the Continental Divide on the boundary between Montana and Idaho. This is one of the railroads which climb the Rocky Mountains, making it possible to travel without change from the Pacific-coast states to the Central Plains.

Trace the route of this railroad on the map between pages 95 and 98

Fig. 591. This view shows a muddy, unimproved road over which transportation is slow and costly. As the inland commerce of the United States has increased, all the states have taken measures to improve the roads in order that products may be transported quickly and easily. Contrast this road with the one in Fig. 592

Fig. 592. The road in this view has been improved. Its surface is now hard and smooth, and wagons and motor trucks may pass over it with speed and safety. The two traction engines are drawing cars of road-building materials. Of what advantage is it to the nation to have good roads in place of bad roads?

Waterways. At first the waterways were the chief routes for the transportation of freight and the chief routes of travel. The rivers of the Mississippi system directed the movements of people and of goods in the interior of the country. The Great Lakes became important routes of transportation, and since the opening of the canals between Lakes Superior and Huron the traffic on these lakes has been very heavy. More tons of freight now pass from Lake Superior to ports on the other Great Lakes than are handled at New York, London, and Liverpool put together, and that is in spite of the fact that the canals at the Sault St. Marie are frozen for a period of three or four months each year.

The Great Lakes will continue to be an important route for the shipment of copper, iron, and grain eastward, and of coal westward (Fig. 589). Large quantities of lumber are now being carried on the lake steamers, and that will continue to be so for some years to come.

River transportation has not been promoted or developed in this country as it might have been. The countries in the Central Plain of Europe make a much greater use of their rivers as highways than we do of our rivers in the interior plains. Our neglect may in time be corrected. In the early days of settlement the movement of goods and of people was chiefly along east-and-west lines. Our foreign trade was, and continues to be, chiefly with the countries of western Europe. *See Appendix, Plate B.* It was very natural, therefore, that for a time the rivers flowing toward the Gulf of Mexico should be largely neglected.

Now the trade of the United States with South America and with all the countries bordering the great American Mediterranean is rapidly increasing. The American Mediterranean includes the Caribbean Sea and the Gulf of Mexico. It lies between North and South America. The opening of the Panama Canal has made the countries of western South America and those to the west of the Pacific Ocean more easily accessible from the eastern part of our country. This should lead also to a greater use of our inland waterways in the Mississippi River system, so that manufactured goods from the interior of our country can go by way of New Orleans, rather than by way of New York, to Central America and South America. This use of the rivers should relieve the railroads of a great burden of work and reduce the cost of transporting certain articles.

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Fig. 593. Motor trucks now play a very important part in the inland commerce of the United States. The trucks in this view are lined up in front of a great freight terminal in New York City, waiting to be loaded with goods for delivery. Of what value are motor trucks to inland commerce?

Fig. 594. To-day all the large cities of the United States are important railroad centers. Each city has at least one and often several great railroad stations, and a network of tracks over which passenger and freight trains are arriving and leaving at all hours. This view shows the new railroad station at Detroit. Name ten great railroad centers in this country. *See map between pages 95 and 98*

Railroads. The development of our rich interior and Western states came just at the time when the American locomotive was being perfected and during the era of great railroad construction. It would be very difficult to say what stage in the settlement and development of our vast territory we should have reached by this time if no railroads had been constructed. These roads have made it possible to transport the products of the farms and ranches quickly, to send ores from the Western mines to smelters, to bring to markets in the Mississippi Valley the sheep and cattle from the mountain and plateau regions, and to ship westward the manufactured goods from the eastern and central industrial districts. Great railroads bind together the northern and southern portions of our country, giving to the people living in each portion the advantage of using products raised or produced in the other.

The railroads have bound the country together. They have made it convenient for business men to travel from one part of the country to another and meet those with whom they are trading. The railroads have invited people to travel for pleasure and thus see and appreciate the value of the different parts of our country. They have made it possible for representatives to come easily from the most distant parts of the country and take part in the government of the nation at Washington. The United States is a large country, but the American systems of railroads have removed the difficulties that great distances presented and have enabled us to develop as a strong and united people (Figs. 590, 594).

FOREIGN COMMERCE

Our foreign trade began in a very simple way. The planters in Virginia and neighboring colonies shipped their tobacco directly from their wharves to England and received in trade manufactured goods. For some time the colonists in this country looked to the mother country for manufactured articles. The settlers in New England had an abundance of timber from which to build ships, and they had a surplus of lumber and fish. These natural resources led to the opening of foreign trade. Vessels left the New England ports with cargoes of lumber for England and fish for Spain. They traded their cargoes for manufactured goods and started for the coast of Africa. There they took on cargoes of slaves and sailed westward for the West Indies. Some of the slaves were left on the islands of the West Indies in exchange for sugar and molasses that were brought to New England and there made into rum.

The sailing vessels took advantage of the ocean currents and of the prevailing winds on that circuit. When the steamboat was invented, the traffic east and west across the north Atlantic increased rapidly, until to-day it is the route of heaviest ocean traffic in the world. We have been sending bulky cargoes of cotton, wheat, corn, meat, lumber, and copper over this route to Europe. We have been receiving less bulky shipments of manufactured articles and, in addition, thousands and thousands of emigrants from Europe.

We have produced more food than we needed and have taken in exchange products from European factories.

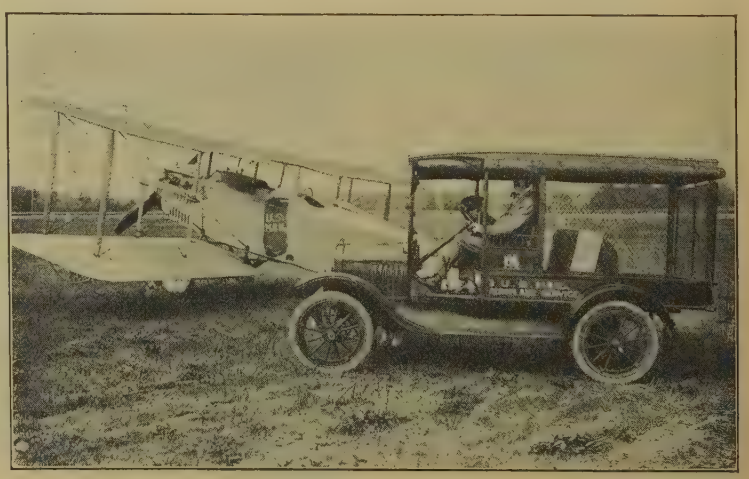

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Fig. 595. The newest means of transportation in the United States is the aëroplane. The plane in this picture is a government machine which is used for carrying mail. At present aëroplanes are not used very generally for freight or passenger service, but it is believed that in the future they will be serviceable for this purpose

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Fig. 596. Enormous quantities of raw materials from foreign countries arrive at our seaports every week. Piled up in the foreground of this view are logs from a species of hardwood tree which grows in the West Indies. These logs will be sent to a factory where they will be used in the manufacture of furniture

Since 1850 there has been a remarkable change in the foreign trade of the United States. In 1850 about 62 per cent of our exports were raw, or crude, materials, to be used in manufacturing, and about 17 per cent were manufactured products. In 1916 about 12 per cent were raw materials, and about 62 per cent were manufactured articles.

Our imports in 1850 were about 6 per cent raw materials and 70 per cent manufactured articles; and in 1916 about 43 per cent of our imports were raw materials for our factories, and about 30 per cent were manufactured products.

This change has a very important meaning. We are not a land to which the crowded nations of Europe may always look for foods and crude materials for manufacture, and we are not a country where the European nations can always expect to unload their surplus of manufactured articles.

We shall need the food we produce, and more; and we shall manufacture all or most of the articles that we need. Our demands from foreign lands are therefore going to be certain foods and various other raw materials which, for different reasons, we cannot produce in this country or which we can secure more economically from foreign countries in exchange for our exports (Figs. 596, 597).

We shall want to import coffee, sugar, cacao, rice, spices, and bananas; and we shall want silk, rubber, Manila hemp, jute, and a few other fibers. Palm oil and other products from tropical forests will be imported also. We shall probably continue to import large quantities of wool and great numbers of hides and skins.

All this means that in the future we shall look more to the countries in the tropics, and to sparsely settled countries such as those in South America, for trade relations. We shall have manufactured goods in excess of our needs, to send to the new agricultural countries of South America. The trade may then be expected to increase more rapidly along north-and-south lines than along the east-and-west routes across the Atlantic.

We may also look forward with confidence to a great increase in the trade across the Pacific Ocean. The people of eastern Asia and of Australia, New Zealand, the Philippines, the Hawaiian Islands, and certain of the smaller islands of the Pacific are sure to want some of the wonderfully useful articles invented and manufactured in the United States; and in exchange they will send raw materials, foods, and many articles from their factories that we enjoy having in our homes.

Problems and review questions. 1. How, in general, does the westward-moving freight differ from that moving eastward in this country? 2. What inland waterways are now much used? 3. What ones offer great opportunities for future development and usefulness?

4. What reasons are there for expecting the Mississippi River system to come into greater use in the transfer of freight? 5. In what ways have the railroads helped in the development of the United States?

6. With what countries is most of our foreign trade now? How may this be explained? 7. How has our foreign trade changed in the last seventy years? Why? 8. Why do we now expect to increase our trade with South American countries and countries across the Pacific? 9. What kinds of articles shall we probably always want to import? From what countries can we get them?

Home work. 1. What parts of this country and what foreign lands are represented by the food used in your home? 2. What articles have you seen that were manufactured in a foreign country?

Fig. 597. This ship is in dock at Charleston, South Carolina. It has come from the west coast of South America by way of the Panama Canal. On its way north it stopped at Limon, Costa Rica. What products has it brought to Charleston? Now it is being loaded for a trip to Europe. What will its cargo be? What things will it bring back from Europe?

SUMMARY AND CONCLUSION

The first colonists who settled on the Atlantic coast of North America came from the countries of western Europe. Most of them were English, although there were many Dutch, some French, some Swedes, and some Spanish.

They came for greater freedom. Some wanted greater religious freedom; others wanted greater opportunities to develop estates of their own; many wanted greater political freedom.

These people were fortunate in settling in a land in the north temperate zone, with a climate that was suitable for active lives. The temperature was not too cold or too warm for men to work in; the rainfall was not too little or too much, but just about right for agriculture; the changes from day to day and from month to month gave variety to the weather and kept the settlers active and energetic. The change from summer to winter compelled the settlers to use foresight. They found it necessary to look ahead and provide food, clothing, shelter, and fuel.

The Appalachian Highlands helped for some time to keep these early settlers near the Atlantic coast. Here they had many interests in common and soon developed a strong and independent nation.

As time passed, these people found that they were in a country of vast natural resources. The fishing grounds, the harbors, the soils, and the timber and other building materials encouraged the colonists to establish permanent homes and to engage in foreign commerce.

Little by little the settlers pushed farther and farther west. After crossing the Appalachian Mountains they followed the navigable rivers or the shores of the Great Lakes. The rich farm lands of the great interior of this country were largely brought under cultivation. In time the farming and grazing lands between the Missouri River and the Rocky Mountains were settled. Many prospectors went far west and explored the mountain and plateau regions until all the land in the United States, from the Atlantic to the Pacific, came to be known.

Discoveries of coal, oil, and gas, and of iron, copper, gold, silver, lead, zinc, and numerous other minerals were made, and as a result mining and manufacturing have been developed on a large scale.

The wonderful prosperity of those living in this country led millions of other people to come here. Immigrants came from nearly every country in the world. Each of the larger nations of Europe is represented in the population of the United States. Most of the nations of Asia also are represented. Negroes from Africa were brought here, and natives from many of the islands of the Pacific Ocean have found their way to this country.

A remarkable development of industries and commerce followed. We needed more raw material. Certain manufacturing plants required material grown only in the tropics. Foreign commerce became more and more important, and foreign travel became more and more common. In time, and in a most natural way, we came to have a real interest in almost all parts of the world.

We should appreciate but not boast of the fact that we are now the wealthiest nation in the world. That great wealth has brought with it a great responsibility. We must help other people and do more good in the world than any other nation. Our great natural resources have made it possible for us to become the leading manufacturing nation. We must now supply manufactured goods to distant lands and especially to people in newly settled parts of the earth and in parts where coal and iron are scarce. Our farming implements and our machinery should go to other lands to help other people to gain prosperity in the development of their resources.

The people came to this new country with a willingness to work hard, to put up with some difficult conditions, and to work together so that a new country might be established, with greater freedom for the inhabitants.

Many of those who came to the New World were people with enthusiasm and with high ideals and great powers of imagination. They saw here the possibilities of developing a great nation of free people. The descendants of those people have grown up in an atmosphere of freedom. A great system of public schools has been developed, and in those schools all children have learned the history of the founding of this nation, the ideals of the early colonists, and about the people who have been the leaders from time to time as the nation has grown.

In time we came into possession of foreign lands. We assumed new responsibilities in caring for those lands and in governing, or helping to govern, other people. In the World War of 1914–1918 we took an important part in order that peace might be made secure in this world and that other peoples might enjoy freedom.

We now have a great responsibility, with other nations, — to help maintain peace and freedom in the world. To meet these responsibilities we must maintain order and prosperity in this country. We must conserve the great natural resources and work together in the friendliest spirit to produce food and the raw materials used in the making of clothing and in the building of houses. We must, however, do much more than merely support life; we must aim to promote the higher and better education of all people, to promote the fine arts of music, painting, and sculpture, and in every way possible to make the social conditions in the community where we live, and in the whole world, more pleasant.

APPENDIX

REFERENCE BOOKS

The names of the following publishing houses are abbreviated as below: American Book Company, New York (A.B.C.); American Geographical Society, New York (Am. G. S.); D. Appleton and Company, New York (Appleton); Asia Publishing Company, New York (Asia); Adam and Charles Black, London (A. & C. Black); The Century Company, New York (Cent.); Dodd, Mead and Company, New York (Dodd); E. P. Dutton and Company, New York (Dutton); Educational Publishing Company, Boston (Ed. Pub.); A. Flanagan Company, Chicago (Flanagan); Ginn and Company, Boston (Ginn); Harper and Brothers, New York (Harpers); D. C. Heath & Co., Boston (Heath); Henry Holt and Company, New York (Holt); Houghton Mifflin Company, Boston (H. M.); Orange Judd Company, New York (Judd); J. B. Lippincott Company, Philadelphia (Lip.); Longmans, Green & Co., New York (Longmans); The Macmillan Company, New York (Mac.); National Geographic Society, Washington, D. C. (N. G. S.); Oxford University Press, London, England (Oxford); Kegan Paul, Trench, Trübner and Company, London (Kegan Paul); Rand McNally & Company, Chicago (Rand); Fleming H. Revell Company, New York (Revell); Royal Geographical Society, London (R. G. S.); Royal Scottish Geographical Society, Edinburgh (R. S. G. S.); Charles Scribner's Sons, New York (Scrib.); Silver, Burdett & Company, New York (Burdett); Frederick A. Stokes Company, New York (Stokes).

Standard Books of Reference. *Brigham, A.P., Commercial Geography (Ginn); Chisholm, G. G., Handbook of Commercial Geography (Longmans); Curr, A. L., Commercial Geography — An Intermediate Text-Book (A. & C. Black); Encyclopædia Britannica (Cambridge University Press); *Gregory, Keller, and Bishop, Physical and Commercial Geography (Ginn); Herbertson, F. L. D., The Clarendon Geography (The Clarendon Press, Oxford); McFarlane, J., Economic Geography (Mac.); Mill, H. R., The International Geography (Appleton); Salisbury, R. D., Physiography (Holt); Salisbury, Barrows, and Tower, Modern Geography (Holt); Semple, E. C., Influences of Geographic Environment (Holt); Smith, R. J., Industrial and Commercial Geography (Holt); Stanford, E., Compendium of Geography — North America, Central and South America, Europe, Asia, Africa, Australia (Edward Stanford, London); The Statesman's Year Book, an annual (Mac.).

Standard Atlases and Charts. Bartholomew, J. G., An Atlas of Economic Geography (Oxford); The Century Dictionary and Cyclopedia, Vol. X, Atlas (Cent.); Geography of the World's Agriculture (Dept. of Agriculture); Shepherd, W. R., Historical Atlas (Holt); United States Geological Survey Maps (Address: The Director, United States Geological Survey, Washington, D. C.); Vidal-Lablache, P., Atlas Général (A. Colin).

Standard Magazines. *Asia — Journal of the American Asiatic Association* (Asia); *Geographical Journal* (R. G. S.); *Geographical Review* (Am. G. S.); *Journal of Geography* (Am. G. S.); *National Geographic Magazine* (N. G. S.); *Scottish Geographic Magazine* (R. S. G. S.).

Government Publications. *Department of Agriculture:* (1) Yearbook of the Department of Agriculture; (2) Daily Weather Map, Washington, D. C., Edition (Address: The Editor in Chief, Division of Publications, Department of Agriculture, Washington, D. C.). *Bureau of the Census:* (1) Reports and bulletins of the census (Address: The Director, Bureau of the Census, Washington, D. C.); (2) United States Geological Survey bulletins and maps (Address: The Director, United States Geological Survey, Washington, D. C.).

North America. Brigham, A. P., Geographic Influences in American History (Ginn); *Carpenter, F. G., Geographical Readers — North America (A. B. C.); *Herbertson, F. D. and A. J., Descriptive Geographies — North America (A. & C. Black); *Rocheleau, W. F., The Geography of Commerce and Industry (Ed. Pub.); Semple, E. C., American History and its Geographic Conditions (H. M.).

The United States. *Allen, N. B., Geographical and Industrial Studies — United States (Ginn); *Dondliger, P. T., The Book of Wheat (Judd); *Fairbanks, H. W., The Western United States (Heath); *Fisher, E. F., Resources and Industries of the United States (Ginn); Gannett, H., United States (in Stanford's Compendium); McMurry, C. A., Type Studies from the Geography of the United States (Mac.); Shaler, N. S., The Story of Our Continent (Ginn); Smith, R. J., The Story of Iron and Steel (Appleton); Tower, W. S., The Story of Oil (Appleton); Van Hise, C. R., Resources of the United States and their Conservation (Mac.).

Possessions of The United States. Brooks, A. H., Geography of Alaska (Professional Paper 45, United States Geological Survey); *George, M. M., Little Journeys to Alaska and Canada (Flanagan); *George, M. M., Little Journeys to Hawaii and the Philippines (Flanagan); *Greater America (Perry Mason Company); *Knapp, A., The World and its People — Book XI, The Story of the Philippines (Burdett); MacClintock, S., The Philippines (A. B. C.).

Other Countries of North America. *Bishop, F., Panama, Past and Present (Cent.); The Canada Year Book, an annual; Enock, C. R, Mexico (Scrib.); Koebel, W. H., Central America (Scrib.).

South America. *Allen, N. B., South America (Ginn); Bowman, I., South America (Rand); Bryce, J., South America (Mac.); Buley, E. C., Brazil (Appleton); *Carpenter, F. G., South America (A. B. C.); Enock, C. R., Ecuador (Scrib.); Enock, C. R., Peru (Scrib.); *Herbertson, F. D. and A. J., Central and South America (A. & C. Black); Koebel, W. H., Paraguay (Scrib.); Koebel, W. H., Uruguay (Scrib.); Martínez and Lewandowski, The Argentine in the Twentieth Century (Scrib.); Scott Elliott, G. F., Chile (Scrib.).

Europe. *Allen, N. B., The New Europe (Ginn); *Carpenter, F. G., Europe (A. B. C.); *Chamberlain, J. F., The Continents and their People — Europe (Mac.); *Herbertson, F. D. and A. J., Europe (A. & C. Black); Lyde, L. W., The Continent of Europe (Mac.); Mackinder, H. J., Britain and the British Seas (Appleton); Partsch, J., Central Europe (Appleton).

Africa. *Carpenter, F. G., Africa (A. B. C.); *Du Chaillu, P., Adventures in the Great Forest of Equatorial Africa (Scrib.); *Herbertson, F. D. and A. J., Africa (A. & C. Black).

Asia. *Allen, N. B., Asia (Ginn); *Carpenter, F. G., Asia (A. B. C.); *Chamberlain, J. F., Asia (Mac.); *Finnemore, J., Homes of Many Lands — India (A. & C. Black); *Herbertson, F. D. and A. J., Asia (A. & C. Black); Hogarth, D. G., The Nearer East (Appleton); Holdich, T., India (Appleton); *Huntington, E., Asia (Rand); Little, A., The Far East (Appleton); *Lyde, L. W., A Geography of Asia (Mac.); *Redway, J. W., All Around Asia (Scrib.).

Australia. *Carpenter, F. G., Australia, Our Colonies and Islands of the Sea (A. B. C.); *Fox, F., Australia (A. & C. Black); *Gilson, J. C., Wealth of the World's Waste Places and Oceania (Scrib.); *Herbertson, F. D. and A. J., Australia and Oceania (A. & C. Black); *Kellogg, E. M., The World and its People — Book VIII, Australia and the Islands of the Sea (Burdett).

Polar Regions. *Horton, The Frozen North (Heath); *Hutton, S. K., Among the Eskimos of Labrador (Lip.); MacMillan, D. B., Four Years in the White North (Harpers); Peary, R. E., The North Pole (Stokes); *Rasmussen, K., The People of the Polar North (Kegan Paul); *Schwatka, F., The Children of the Cold (Ed. Pub.); Stefánsson, V., My Life with the Eskimo (Mac.); The Friendly Arctic (Mac.).

World Geography. *Herbertson, F. D. and A. J., Man and his Work (A. & C. Black); Herbertson, F. D. and A. J., World Geography (The Clarendon Press, Oxford); *Lyde, L. W., Man and his Markets (Mac.).

[1] Books starred are suitable for the use of the pupil.

Map Plate, Patented July 5, 1921 • Method of Making Maps, Patented July 5, 1921

M 60° N Long. 80° East O from 100° Green. P 120° Q 140° R 160° S 180° T

C O C E A N

Barents, 1596-1597
NOVA ZEMBLA
TAIMYR PENINSULA
NEW SIBERIAN IS.
ARCTIC CIRCLE
S I B E R I A
A S I A
BERING SEA
KAMCHATKA PENINSULA
Bering, 1741
ALEUTIAN IS.
SAKHALIN ISLAND
La Pérouse, 1787
Bering, 1741
JAPAN
De Vries, 1643
13th-Century
Marco Polo
TIBET
PERSIA
C H I N A
P A C I F I C
I N D I A
TROPIC OF CANCER
Albuquerque, 1515
PHILIPPINE IS.
Magellan, 1519-1522
SIAM
MALAY PENINSULA
Death of Magellan, 1521
CEYLON
Albuquerque, 1511
BORNEO
Vasco da Gama, 1498
EQUATOR
I N D I A N O C E A N
SUMATRA
CELEBES
JAVA
NEW GUINEA
1616
Cook - First Voyage, 1768-1771
Magellan's Voyage completed by del Cano
1522
DAGASCAR
1616
A U S T R A L I A
TROPIC OF CAPRICORN
Dutch Explorers
1622
Cook - First Voyage 1768 - 1771
Tasman, 1642
TASMANIA
Tasman, 1642
NEW ZEALAND
O C E A N

Home countries and lands explored by

Norse — Portuguese
English — French
Dutch — Spanish — Russians

Principal routes of

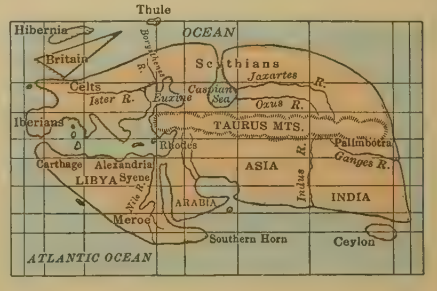
Marco Polo — Stanley and Livingstone
Nansen — Peary
Amundsen (in the Arctic regions) — Stefansson

Amundsen reached South Pole, Dec. 14, 1911
Scott reached South Pole, Jan. 18, 1912
ANTARCTIC CIRCLE

M 60° N Long. 80° East O from 100° Green. P 120° Q 140° R 160° S 180° T

I
THE WORLD ACCORDING TO HOMER
About 1000 years B. C.

II
THE WORLD ACCORDING TO HERODOTUS
600 to 500 years B. C.

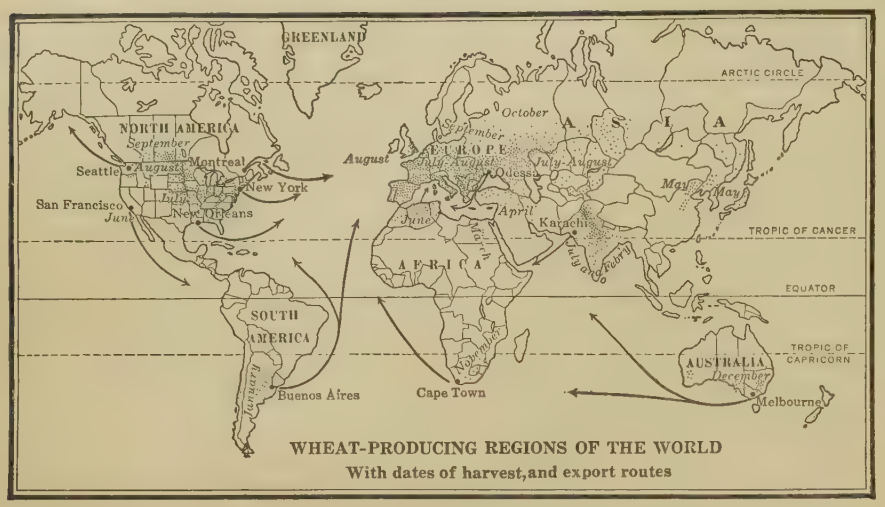


III
THE WORLD ACCORDING TO ERATOSTHENES
400 to 300 years B. C.

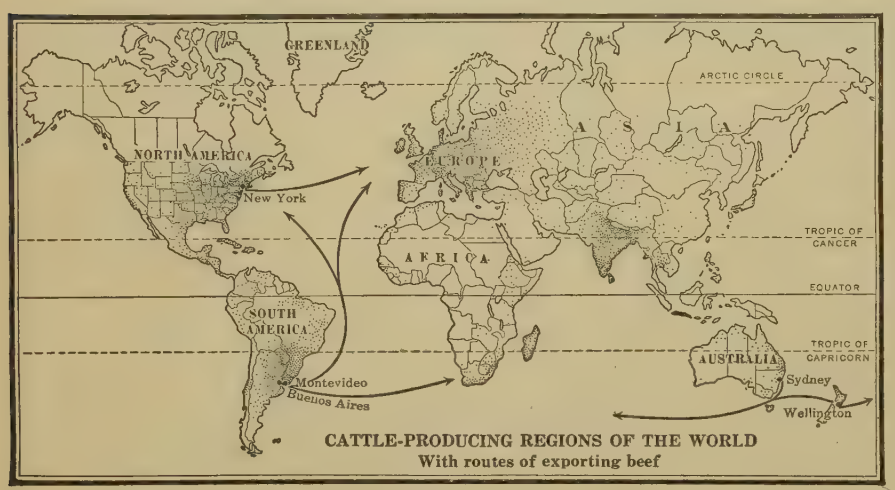
IV
THE WORLD ACCORDING TO PTOLEMY
100 to 200 years A. D.

After Vidal-Lablache

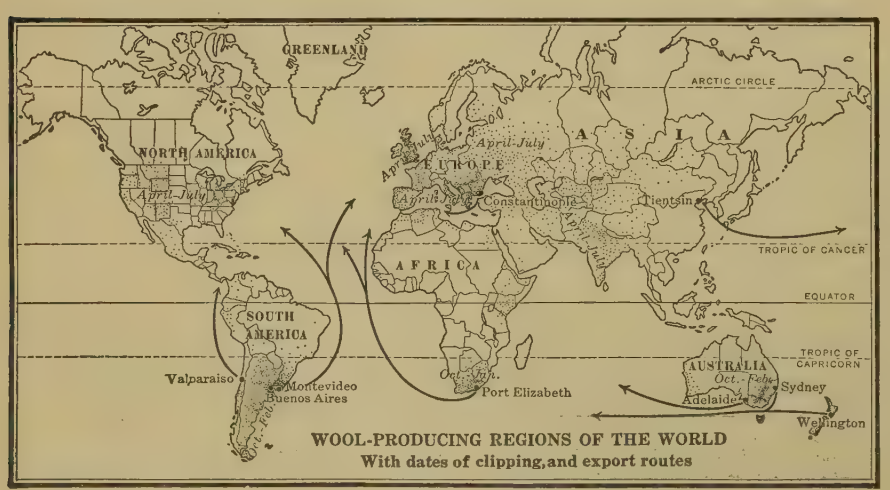
© Ginn and Company



Most of the wheat of the world is grown in temperate climates where the rainfall is not more than 30 inches. What countries seem to be of world importance in the production of wheat? What countries seem to produce more wheat than they need? During what months is wheat harvested in the different parts of the world?



The three countries that lead in the production of cattle are India, the United States, and Argentina. Although India ranks first in number, the cattle in that country are used very little for meat or milk but mostly as beasts of burden. Which of the cattle-raising countries are exporters of beef to other parts of the world?



The three countries that lead in the production of wool are Australia, Argentina, and the United States. What countries are the chief exporters of wool? Where is the wool used? Compare the months in which sheep are clipped in the northern hemisphere with the months of clipping in the southern hemisphere. At what season are sheep clipped all over the world?

HEIGHTS OF PRINCIPAL MOUNTAINS

NORTH AMERICA

Name	Location	Height in Feet
Mt. McKinley	Alaska	20,300
Mt. Logan	Canada	19,540
Mt. Orizaba	Mexico	18,242
Mt. St. Elias	Alaska-Canada	18,000
Mt. Popocatepetl	Mexico	17,782
Mt. Iztaccihuatl	Mexico	17,343
Mt. Whitney	California	14,501
Mt. Rainier (Tacoma)	Washington	14,408
Mt. Shasta	California	14,380
Longs Peak	Colorado	14,255
Pikes Peak	Colorado	14,110
Mt. Holy Cross	Colorado	13,978
Lassen Peak	California	10,437
Mt. Washington	New Hampshire	6,293
Mt. Marcy	New York	5,344

SOUTH AMERICA

Mt. Aconcagua	Chile-Argentina	22,812
Mt. Illimani	Bolivia	21,188
Mt. Chimborazo	Ecuador	20,702
Mt. Cotopaxi	Ecuador	19,498
Mt. Misti	Peru	19,200
Mt. Tolima	Colombia	18,432
Mt. Itatiaya	Brazil	9,823
Mt. Roraima	British Guiana	8,635

EUROPE

Mt. Elbruz	Transcaucasia	18,465
Mt. Blanc	France	15,780
Monte Rosa	Italy	15,215
Mt. Etna	Sicily	10,742
Ben Nevis	Scotland	4,406
Mt. Vesuvius	Italy	4,260

ASIA

Mt. Everest	Nepal-Tibet	29,003
Mt. Kanchanjanga	India	28,146
Mt. Dapsang	Tibet	26,477
Mt. Demavend	Persia	18,603
Mt. Ararat	Armenia	16,925
Mt. Hermon	Palestine	9,052
Mt. Sinai	Sinai Pen.	8,593

AFRICA

Mt. Kilimanjaro	Tanganyika Terr.	19,456
Mt. Kenya	Kenya Colony	18,373
Mt. Ruwenzori	Uganda	18,045
Mt. Miltsin	Morocco	11,400

AUSTRALIA AND OCEANIA

Mauna Loa	Hawaiian Islands	13,675
Mt. Kosciusko	Australia	7,328
Kilauea	Hawaiian Islands	4,039

PRINCIPAL RIVERS

NORTH AMERICA

Name	Length in Miles	Basin Area in Square Miles
Missouri-Mississippi	4,221	1,250,000
Missouri (entire length), 2,945 miles Mississippi (entire length), 2,486 miles		
Mackenzie	2,400	440,000
Yukon	2,300	440,000
St. Lawrence	2,000	350,000

NORTH AMERICA (Continued)

Name	Length in Miles	Basin Area in Square Miles
Rio Grande	1,800	180,000
Nelson-Saskatchewan	1,660	595,100
Columbia	1,400	250,000
Colorado	1,100	250,000

SOUTH AMERICA

Amazon	3,900	2,500,000
Paraná-Plata	2,300	1,250,000
São Francisco	1,680	190,000
Orinocó	1,500	300,000

EUROPE

Volga	2,300	500,000
Danube	2,000	300,000
Dnieper	1,230	175,000
Rhine	960	65,000
Dvina	700	140,000
Elbe	550	42,000
Saône-Rhône	550	33,000
Seine	497	23,000
Thames	215	6,000

ASIA

Ob	3,200	920,000
Yangtze	3,100	500,000
Amur	2,900	600,000
Hwang	2,700	540,000
Lena	2,600	600,000
Brahmaputra	2,000	425,000
Indus	2,000	320,000
Ganges	1,800	450,000

AFRICA

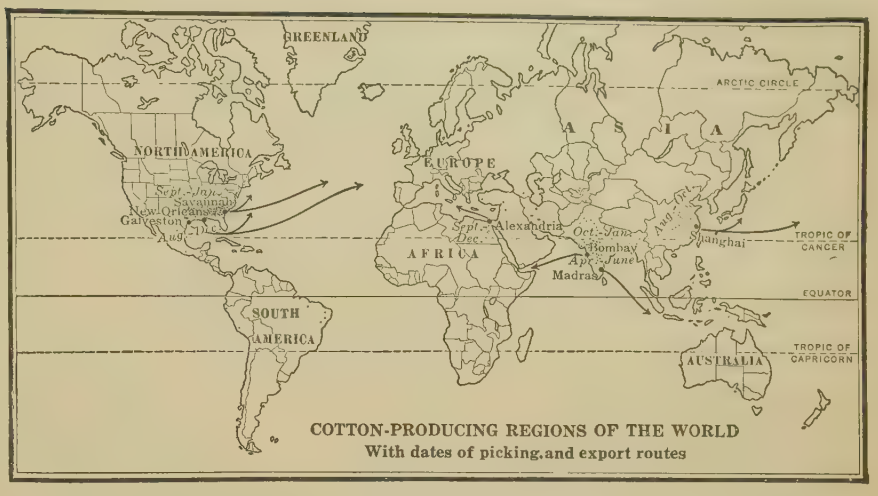
Nile	4,000	1,400,000
Niger	3,500	600,000
Congo	2,900	1,500,000
Zambezi	1,800	440,000

NATIONAL PARKS — UNITED STATES

National Parks	Location	Square Miles
Hot Springs, 1832	Middle Arkansas	1½
Yellowstone, 1872	Northwestern Wyoming	3,348
Sequoia, 1890	Middle eastern California	252
Yosemite, 1890	Middle eastern California	1,125
General Grant, 1890	Middle eastern California	4
Mt. Rainier, 1899	West central Washington	324
Crater Lake, 1902	Southwestern Oregon	249
Wind Cave, 1903	South Dakota	17
Platt, 1904	Southern Oklahoma	1⅓
Sullys Hill, 1904	North Dakota	1⅕
Mesa Verde, 1906	Southwestern Colorado	77
Glacier, 1910	Northwestern Montana	1,534
Rocky Mountain, 1915	North middle Colorado	398
Hawaii, 1916	Hawaiian Islands	118
Lassen Volcanic, 1916	Northern California	124
Mt. McKinley, 1917	South central Alaska	2,200
Grand Canyon, 1919	North central Arizona	958
Lafayette, 1919	Maine coast	8
Zion, 1919	Southwestern Utah	120

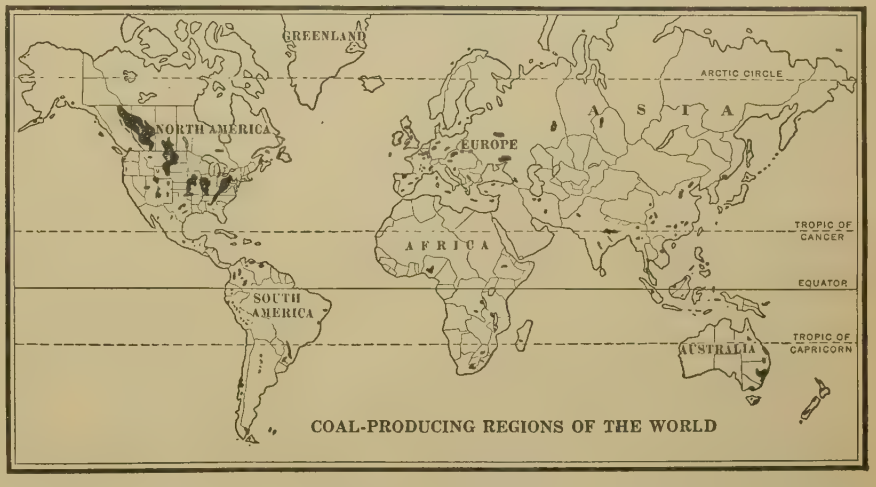
AREA OF OCEANS

	Square Miles		Square Miles
Pacific	65,688,000	Antarctic	9,000,000
Atlantic	38,640,000	Arctic	4,636,000
Indian	25,500,000		



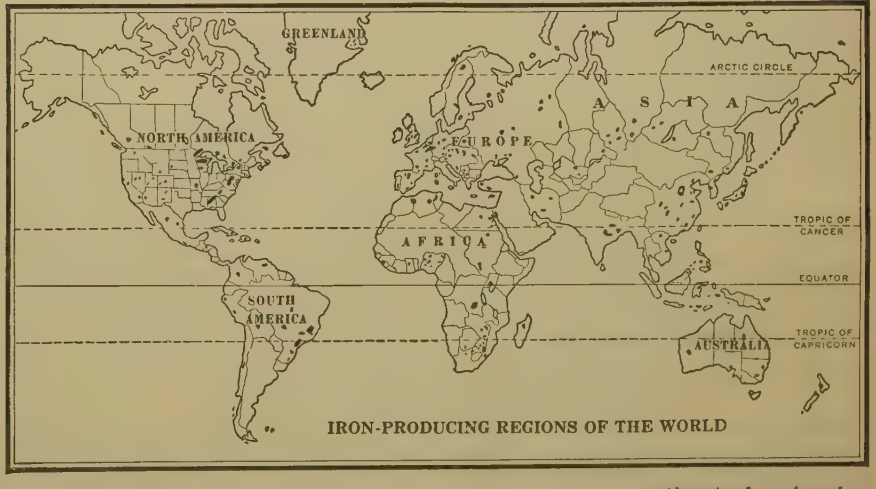
COTTON-PRODUCING REGIONS OF THE WORLD
With dates of picking, and export routes

The United States produces about three fifths of the world's cotton. India and Egypt are also important cotton-raising countries. Egypt produces an especially fine quality of long-fibered cotton. The United Kingdom imports more cotton than any other country. During what months is most of the cotton-picking done? What countries are exporters of cotton? What are the chief ports of cotton export?



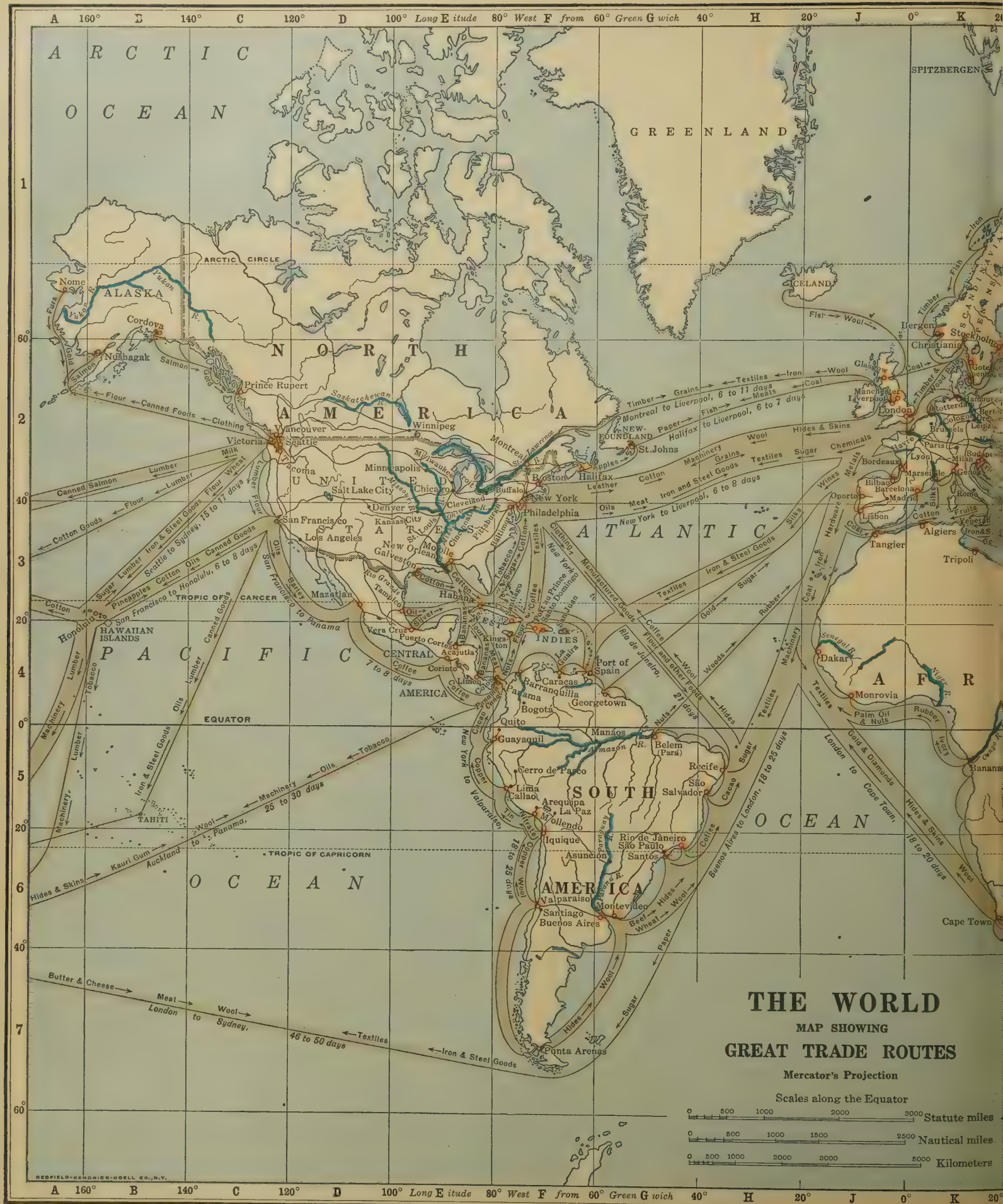
COAL-PRODUCING REGIONS OF THE WORLD

Is there any continent without some coal? What continent seems to have the largest supply of coal? What one seems to have the least coal? The United States and Great Britain are the two leading coal-producing countries of the world. The amount of coal used per person is larger in the United States than in any other country



IRON-PRODUCING REGIONS OF THE WORLD

Iron is a very widely distributed mineral resource. Is there any continent where iron has not been discovered? The production of iron in the United States is greater than in any other country in the world. The iron deposits in southern Brazil are very great, but as yet they have not been extensively mined. What countries produce both iron and coal?


A 160° B 140° C 120° D 100° Longitude 80° West F from 60° Greenwich 40° H 20° J 0° K 20°
ARCTIC OCEAN
GREENLAND
SPITZBERGEN
ICELAND
ARCTIC CIRCLE
ALASKA
NORTH AMERICA
UNITED STATES
ATLANTIC OCEAN
PACIFIC OCEAN
SOUTH AMERICA
WEST INDIES
CENTRAL AMERICA
AFRICA
EUROPE
SCANDINAVIA
HAWAIIAN ISLANDS
TAHITI
EQUATOR
TROPIC OF CANCER
TROPIC OF CAPRICORN
Nome
Yukon R.
Fur
Gold
Cordova
Nushagak
Salmon
Prince Rupert
Flour
Canned Foods
Clothing
Saskatchewan R.
Vancouver
Victoria
Seattle
Tacoma
Winnipeg
Milk
Canned Salmon
Lumber
Wheat
Minneapolis
Milwaukee
Detroit
Chicago
Salt Lake City
Denver
Cleveland
Buffalo
New York
Philadelphia
Boston
Montreal
St. Lawrence R.
Halifax
Timber → Grains ← Textiles ← Iron ← Wool ← Coal
Montreal to Liverpool, 6 to 11 days
Halifax to Liverpool, 6 to 7 days
Paper → Fish → ← Meats
NEWFOUNDLAND
St. Johns
Hides & Skins
Machinery
Grains
Wool
Chemicals
Sugar
Textiles
Iron and Steel Goods
Leather
Cotton
Oils
Meat
New York to Liverpool, 6 to 8 days
Apples
Cotton Goods
Iron & Steel Goods
Canned Goods
Seattle to Sydney, 75 to 77 days
Pineapples
Cotton
Oils
Canned Goods
Seattle to Honolulu, 6 to 8 days
San Francisco
Los Angeles
San Francisco to Panama
Bartley
Oils
Kansas City
St. Louis
Pittsburgh
Baltimore
Mobile
New Orleans
Galveston
Cotton
Tobacco
Sugar
Coffee
Textiles
Clothing
Manufactured Goods
New York to Rio de Janeiro, Santos & Buenos Aires
Mazatlan
Rio Grande
Tampico
Habana
Oil
Silver
Vera Cruz
Puerto Cortez
Acajutla
Corinto
Limon
Kingston
Bananas
Flour
Nuts
Cocoa
Port au Prince
Santo Domingo
San Juan
Coffee
Rio de Janeiro
Flour and other Foods
Wool
Woods
Machinery
Textiles
Gold
Rubber
Iron & Steel Goods
Sugar
Hardware
Coal
Iron & Steel
Wines
Metals
Silks
Fruits
Cotton
Lumber
Canned Goods
Tobacco
Machinery
Oils
Iron & Steel Goods
Coffee
Cocoa
Panama Canal
La Guaira
Port of Spain
Caracas
Barranquilla
Panama
Georgetown
Bogotá
Quito
Guayaquil
Manáos
Amazon R.
Belem (Pará)
Recife
São Salvador
Cerro de Pasco
Lima
Callao
Arequipa
La Paz
Mollendo
Iquique
Asuncion
Rio de Janeiro
São Paulo
Santos
Coffee
Cacao
Sugar
Nuts → 21 days ← Hides
Textiles
Senegal R.
Dakar
Monrovia
Niger R.
Palm Oil & Nuts
Rubber
Ivory
Congo R.
Bananas
London to Cape Town, Gold & Diamonds, Hides & Skins, 18 to 20 days
Wool
Cape Town
Tobacco
Machinery
Oils
Iron & Steel Goods
Lumber
Machinery
Wool → Panama, 25 to 30 days
Hides & Skins
Kauri Gum
Auckland
Copper
New York to Valparaiso
Copper
Wool
18 to 28 days
Nitrate
Valparaiso
Montevideo
Santiago
Buenos Aires
Parana R.
Hides
Wool
Beef
Wheat
Paper
Buenos Aires to London, 18 to 25 days
Coffee
Butter & Cheese
Meat
Wool
London to Sydney, 46 to 50 days
Textiles
Iron & Steel Goods
Hides
Sugar
Punta Arenas
Bergen
Stockholm
Christiania
Glasgow
Manchester
Liverpool
London
Rotterdam
Hamburg
Berlin
Cologne
Leipzig
Brussels
Paris
Havre
Lyon
Budapest
Milan
Bordeaux
Marseilles
Genoa
Bilbao
Barcelona
Madrid
Oporto
Rome
Lisbon
Algiers
Tangier
Tripoli
Venice
Iron & Steel
Fish → Wool
Timber
Iron
Coal
Timber & Wood Pulp
Fish
Coal
Iron & Steel Goods
Textiles
Sugar
Wines
Metals
Silks
Cotton
Fruits
Coal
Hardware
Iron & Steel
Gold
Rubber
Machinery
Textiles
Hides
Wool
Woods
Nuts
Rio de Janeiro
Flour and other Foods
21 days
Coffee
Sugar
Cacao
Buenos Aires to London, 18 to 25 days
Hides & Skins
18 to 20 days
Wool
Cape Town
Gold & Diamonds
Ivory
Banana
Rubber
Palm Oil & Nuts
Monrovia
Dakar
Senegal R.
Niger R.
Machinery
Textiles
Coal
Iron & Steel
Sugar
Coffee
Flour and other Foods
Rio de Janeiro
Woods
Wool
Hides
Nuts
21 days
Textiles
Gold
Rubber
Iron & Steel Goods
Sugar
Hardware
Coal
Iron & Steel
Wines
Metals
Silks
Fruits
Cotton
Lumber
Canned Goods
Tobacco
Machinery
Oils
Iron & Steel Goods
Coffee
Cocoa
Panama Canal
Bananas
Flour
Nuts
Cocoa
Port au Prince
Santo Domingo
San Juan
Coffee
Rio de Janeiro
Flour and other Foods
Wool
Woods
Machinery

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THE UNITED STATES

States and Territories	Area in Square Miles	Population Census of 1920
Alabama	51,998	2,348,174
Alaska	590,884	55,036
Arizona	113,956	334,162
Arkansas	53,335	1,752,204
California	158,297	3,426,861
Colorado	103,948	939,629
Connecticut	4,965	1,380,631
Delaware	2,370	223,003
District of Columbia	70	437,571
Florida	58,666	968,470
Georgia	59,265	2,895,832
Hawaii	6,449	255,912
Idaho	83,888	431,866
Illinois	56,665	6,485,280
Indiana	36,354	2,930,390
Iowa	56,147	2,404,021
Kansas	82,158	1,769,257
Kentucky	40,598	2,416,630
Louisiana	48,506	1,798,509
Maine	33,040	768,014
Maryland	12,327	1,449,661
Massachusetts	8,266	3,852,356
Michigan	57,980	3,668,412
Minnesota	84,682	2,387,125
Mississippi	46,865	1,790,618
Missouri	69,420	3,404,055
Montana	146,997	548,889
Nebraska	77,520	1,296,372
Nevada	110,690	77,407
New Hampshire	9,341	443,083
New Jersey	8,224	3,155,900
New Mexico	122,634	360,350
New York	49,204	10,385,227
North Carolina	52,426	2,559,123
North Dakota	70,837	646,872
Ohio	41,040	5,759,394
Oklahoma	70,057	2,028,283
Oregon	96,699	783,389
Pennsylvania	45,126	8,720,017
Rhode Island	1,248	604,397
South Carolina	30,989	1,683,724
South Dakota	77,615	636,547
Tennessee	42,022	2,337,885
Texas	265,896	4,663,228
Utah	84,990	449,396
Vermont	9,564	352,428
Virginia	42,627	2,309,187
Washington	69,127	1,356,621
West Virginia	24,170	1,463,701
Wisconsin	56,066	2,632,067
Wyoming	97,914	194,402

PRINCIPAL COUNTRIES AND COLONIES

NORTH AMERICA	**10,050,000**	**143,000,000**
YEAR	AREA	POPULATION
1918 Bahama Islands	4,404	59,928*
1919 Bermuda Islands	19	21,869
1919 British Honduras	8,592	43,586*
1921 Canada	3,729,665	8,769,489
1918 Costa Rica	23,000*	459,423*
1919 Cuba	44,215	2,898,905
1919 Dominican Republic	19,332*	1,000,000*
1911 Greenland	46,740†	13,449
1914 Guatemala	48,290*	2,003,579*
1912 Haiti (republic)	10,204*	2,500,000*
1920 Honduras	44,275*	637,114
1919 Jamaica	4,431	893,580*
1919 Labrador	120,000	3,647
1921 Mexico	767,198	14,007,970
1919 Newfoundland	42,734	260,922
1917 Nicaragua	49,200*	746,000*
1921 Panama	32,380	401,428
1920 Salvador	7,225*	1,336,442*
1920 United States	3,026,789[1]	105,710,620[1]
SOUTH AMERICA	**7,500,000**	**59,000,000**
1919 Argentina	1,153,119	8,533,332
1915 Bolivia	514,155	2,889,970*
1920 Brazil	3,290,564*	30,645,296*
1919 British Guiana	89,480	305,991*
1919 Chile	289,829	4,038,050
1918 Colombia	440,846*	5,847,491
1920 Dutch Guiana	46,060	109,810
1915 Ecuador	116,000*	2,000,000*
1918 French Guiana	32,000*	26,325
1917 Paraguay	165,000*	1,000,000*
1908 Peru	722,461	4,500,000*
1919 Uruguay	72,153	1,461,492
1918 Venezuela	398,594*	2,250,000
EUROPE	**4,000,000**	**470,000,000**
1920 Albania	11,000*	850,000*
1920 Austria	32,000*	6,500,000*
1920 Belgium	11,759	7,593,864
1920 Bulgaria	41,000*	4,300,000*
1920 Czechoslovakia	56,316	14,000,000*
1920 Denmark	17,000	3,100,000*
1921 England	50,874	35,678,530
1920 Esthonia	23,160*	1,750,000*
1920 Finland	129,189	3,305,000
1921 France	212,659	39,209,766
1920 Germany	176,629*	55,785,006*
1920 Greece	59,846*	7,000,000*
1920 Hungary	36,000*	8,000,000*
1919 Iceland	39,709	92,818*
1911 Ireland	32,586	4,390,219
1921 Italy	124,000*	38,835,184
1920 Jugoslavia	101,000*	14,500,000*
1920 Latvia	25,000*	2,500,000*
1920 Lithuania	36,532*	4,651,000*
1916 Luxemburg	999	263,824
1919 Netherlands	13,196	6,831,231
1920 Norway	125,001	2,691,855*
1920 Poland	160,000*	35,000,000*
1911 Portugal	35,490	5,957,985
1920 Rumania	122,000	17,000,000*
1920 Russia	1,758,000*	110,000,000*
1921 Scotland	30,405	4,882,288
1919 Spain	190,050	20,783,844*
1919 Sweden	173,035	5,847,037*
1920 Switzerland	15,976	3,861,508
1920 Turkey (in Europe)	2,238*	1,281,000*
1920 Ukraine	498,100*	46,000,000*
1921 Wales	7,466	2,206,712

[1] Exclusive of outlying possessions.

	AREA	POPULATION
Guam	210	13,275
Panama Canal Zone	527	22,858
Philippine Islands	115,026	10,350,640
Porto Rico	3,435	1,299,809
Samoa	77	8,056
Virgin Islands	132	26,051

ASIA	**16,000,000**	**860,000,000**
YEAR	AREA	POPULATION
1911 Aden	9,000*	46,165
1921 Afghanistan	250,000*	6,380,500*
1921 Arabia	1,200,000*	5,500,000*
1921 Armenia	80,000*	8,000,000*
1911 Baluchistan	134,638	834,703
1918 Bhutan	20,000*	250,000*
1918 Bokhara	83,000	1,250,000
1919 Ceylon	25,481	4,757,596*
1914 China	3,913,560	325,000,000*
1920 Chosen (Korea)	84,738	17,284,207
1917 Dutch E. Indies	735,000	47,000,000*
1919 Hejaz	100,000*	750,000*
1921 India	1,802,629	319,075,132
1914 French Indo-China	256,000	16,990,229
1920 Japanese Empire	260,738	77,005,510
1917 Java	50,557	34,157,383*
1918 Khiva	24,000	646,000*
1920 Mesopotamia	143,250	2,849,282
1918 Nepal	54,000*	5,600,000*
1919 Oman	82,000*	500,000*
1919 Palestine	9,000*	647,850
1918 Persia	628,000	9,500,000*
1919 Siam	195,000	8,924,000*
1915 Siberia	4,831,882	10,377,900
1920 Syria	60,000*	3,000,000*
1915 Transcaspia	235,120	552,500
1921 Turkey (in Asia)	172,662*	6,719,000*
AFRICA	**12,170,000**	**130,000,000**
1918 Abyssinia	350,000	8,000,000*
1912 Algeria	343,500	5,563,828
1918 Angola	484,800	4,119,000
1916 Belgian Congo	909,654	11,000,000*
1919 Egypt	350,000	12,878,000*
1913 Former German Possessions	931,210	11,404,023
1920 Fr. Equat. Africa	1,037,131*	9,000,000*
1920 Fr. West Africa	1,800,566*	11,464,377*
1920 Kenya Colony	246,822	2,807,000*
1918 Liberia	40,000*	2,000,000*
1921 Libia	406,000*	6,000,000*
1917 Madagascar	228,000	3,545,264
1918 Morocco	231,500*	6,000,000*
1918 Mozambique	428,132	3,011,600*
1918 Nigeria	336,000*	17,500,000*
1919 Rhodesia	440,000*	1,738,945*
1918 Somaliland (Ital.)	139,430	650,000*
1917 Sudan (Br.)	1,014,400*	3,400,000*
1920 Tunis	50,000*	1,940,000*
1920 Union of South Africa	473,075	7,305,000*
AUSTRALIA AND NEW ZEALAND	**3,000,000**	**5,000,000**
1918 New Guinea (Br.)	157,786	451,274
1919 New South Wales	309,432	2,002,631*
1921 New Zealand	103,581	1,218,270
1919 Northern Territory	523,620	4,706*
1919 Queensland	670,500	725,220*
1919 South Australia	380,070	468,194*
1919 Tasmania	26,215	216,751*
1919 Victoria	87,884	1,495,938*
1919 Western Australia	975,920	331,660*
ANTARCTICA	**5,000,000**	

* Estimated. † Habitable portion.

CITIES AND TOWNS OF THE UNITED STATES HAVING A POPULATION OF OVER 25,000 IN 1920

Akron, O.	208,435	Elgin, Ill.	27,454	Mansfield, O.	27,824	Richmond, Ind.	26,765
Alameda, Calif.	28,806	Elizabeth, N.J.	95,783	Marion, O.	27,891	Richmond, Va.	171,667
Albany, N.Y.	113,344	Elmira, N.Y.	45,393	Medford, Mass.	39,038	Roanoke, Va.	50,842
Allentown, Pa.	78,890	El Paso, Tex.	77,560	Memphis, Tenn.	162,351	Rochester, N.Y.	295,750
Altoona, Pa.	60,331	Erie, Pa.	102,093	Meriden, Conn.	29,867	Rockford, Ill.	65,651
Amsterdam, N.Y.	33,524	Evanston, Ill.	37,234	Miami, Fla.	29,571	Rock Island, Ill.	35,177
Anderson, Ind.	29,767	Evansville, Ind.	85,264	Milwaukee, Wis.	457,147	Rome, N.Y.	26,341
Asheville, N.C.	28,504	Everett, Mass.	40,120	Minneapolis, Minn.	380,582	Sacramento, Calif.	65,908
Atlanta, Ga.	200,616	Everett, Wash.	27,644	Mobile, Ala.	60,777	Saginaw, Mich.	61,903
Atlantic City, N.J.	50,707	Fall River, Mass.	120,485	Moline, Ill.	30,734	St. Joseph, Mo.	77,939
Auburn, N.Y.	36,192	Fitchburg, Mass.	41,029	Montclair, N.J.	28,810	St. Louis, Mo.	772,897
Augusta, Ga.	52,548	Flint, Mich.	91,599	Montgomery, Ala.	43,464	St. Paul, Minn.	234,698
Aurora, Ill.	36,397	Fort Smith, Ark.	28,870	Mount Vernon, N.Y.	42,726	Salem, Mass.	42,529
Austin, Tex.	34,876	Fort Wayne, Ind.	86,549	Muncie, Ind.	36,524	Salt Lake City, Utah	118,110
Baltimore, Md.	733,826	Fort Worth, Tex.	106,482	Muskegon, Mich.	36,570	San Antonio, Tex.	161,379
Bangor, Me.	25,978	Fresno, Calif.	45,086	Muskogee, Okla.	30,277	San Diego, Calif.	74,683
Battle Creek, Mich.	36,164	Galveston, Tex.	44,255	Nashua, N.H.	28,379	San Francisco, Calif.	506,676
Bay City, Mich.	47,554	Gary, Ind.	55,378	Nashville, Tenn.	118,342	San Jose, Calif.	39,642
Bayonne, N.J.	76,754	Grand Rapids, Mich.	137,634	Newark, N.J.	414,524	Savannah, Ga.	83,252
Beaumont, Tex.	40,422	Green Bay, Wis.	31,017	Newark, O.	26,718	Schenectady, N.Y.	88,723
Bellingham, Wash.	25,585	Hagerstown, Md.	28,064	New Bedford, Mass.	121,217	Scranton, Pa.	137,783
Berkeley, Calif.	56,036	Hamilton, O.	39,675	New Britain, Conn.	59,316	Seattle, Wash.	315,312
Bethlehem, Pa.	54,149	Hammond, Ind.	36,004	New Brunswick, N.J.	32,779	Sheboygan, Wis.	30,955
Binghamton, N.Y.	66,800	Hamtramck, Mich.	48,615	Newburg, N.Y.	30,366	Shreveport, La.	43,874
Birmingham, Ala.	178,806	Harrisburg, Pa.	75,917	Newcastle, Pa.	44,938	Sioux City, Ia.	71,227
Bloomington, Ill.	28,725	Hartford, Conn.	138,036	New Haven, Conn.	162,537	Sioux Falls, S.Dak.	25,202
Boston, Mass.	748,060	Haverhill, Mass.	53,884	New London, Conn.	25,688	Somerville, Mass.	93,091
Bridgeport, Conn.	143,555	Hazleton, Pa.	32,277	New Orleans, La.	387,219	South Bend, Ind.	70,983
Brockton, Mass.	66,254	Highland Park, Mich.	46,499	Newport, Ky.	29,317	Spokane, Wash.	104,437
Brookline, Mass.	37,748	Hoboken, N.J.	68,166	Newport, R.I.	30,255	Springfield, Ill.	59,183
Buffalo, N.Y.	506,775	Holyoke, Mass.	60,203	Newport News, Va.	35,596	Springfield, Mass.	129,614
Butte, Mont.	41,611	Houston, Tex.	138,276	New Rochelle, N.Y.	36,213	Springfield, Mo.	39,631
Cambridge, Mass.	109,694	Huntington, W.Va.	50,177	Newton, Mass.	46,054	Springfield, O.	60,840
Camden, N.J.	116,309	Indianapolis, Ind.	314,194	New York, N.Y.	5,620,048	Stamford, Conn.	35,096
Canton, O.	87,091	Irvington, N.J.	25,480	Niagara Falls, N.Y.	50,760	Steubenville, O.	28,508
Cedar Rapids, Ia.	45,566	Jackson, Mich.	48,374	Norfolk, Va.	115,777	Stockton, Calif.	40,296
Charleston, S.C.	67,957	Jacksonville, Fla.	91,558	Norristown, Pa.	32,319	Superior, Wis.	39,671
Charleston, W.Va.	39,608	Jamestown, N.Y.	38,917	Norwalk, Conn.	27,743	Syracuse, N.Y.	171,717
Charlotte, N.C.	46,338	Jersey City, N.J.	298,103	Oakland, Calif.	216,261	Tacoma, Wash.	96,965
Chattanooga, Tenn.	57,895	Johnstown, Pa.	67,327	Oak Park, Ill.	39,858	Tampa, Fla.	51,608
Chelsea, Mass.	43,184	Joliet, Ill.	38,442	Ogden, Utah	32,804	Taunton, Mass.	37,137
Chester, Pa.	58,030	Joplin, Mo.	29,902	Oklahoma City, Okla.	91,295	Terre Haute, Ind.	66,083
Chicago, Ill.	2,701,705	Kalamazoo, Mich.	48,487	Omaha, Nebr.	191,601	Toledo, O.	243,164
Chicopee, Mass.	36,214	Kansas City, Kans.	101,177	Orange, N.J.	33,268	Topeka, Kans.	50,022
Cicero, Ill.	44,995	Kansas City, Mo.	324,410	Oshkosh, Wis.	33,162	Trenton, N.J.	119,289
Cincinnati, O.	401,247	Kearny, N.J.	26,724	Pasadena, Calif.	45,354	Troy, N.Y.	72,013
Clarksburg, W.Va.	27,869	Kenosha, Wis.	40,472	Passaic, N.J.	63,841	Tulsa, Okla.	72,075
Cleveland, O.	796,841	Kingston, N.Y.	26,688	Paterson, N.J.	135,875	Utica, N.Y.	94,156
Clifton, N.J.	26,470	Knoxville, Tenn.	77,818	Pawtucket, R.I.	64,248	Waco, Tex.	38,500
Colorado Springs, Colo.	30,105	Kokomo, Ind.	30,067	Pensacola, Fla.	31,035	Waltham, Mass.	30,915
Columbia, S.C.	37,524	La Crosse, Wis.	30,421	Peoria, Ill.	76,121	Warren, O.	27,050
Columbus, Ga.	31,125	Lakewood, O.	41,732	Perth Amboy, N.J.	41,707	Washington, D.C.	437,571
Columbus, O.	237,031	Lancaster, Pa.	53,150	Petersburg, Va.	31,012	Waterbury, Conn.	91,715
Council Bluffs, Ia.	36,162	Lansing, Mich.	57,327	Philadelphia, Pa.	1,823,779	Waterloo, Ia.	36,230
Covington, Ky.	57,121	Lawrence, Mass.	94,270	Phoenix, Ariz.	29,053	Watertown, N.Y.	31,285
Cranston, R.I.	29,407	Lewiston, Me.	31,791	Pittsburgh, Pa.	588,343	West Hoboken, N.J.	40,074
Cumberland, Md.	29,837	Lexington, Ky.	41,534	Pittsfield, Mass.	41,763	West New York, N.J.	29,926
Dallas, Tex.	158,976	Lima, O.	41,326	Plainfield, N.J.	27,700	Wheeling, W.Va.	56,208
Danville, Ill.	33,776	Lincoln, Nebr.	54,948	Pontiac, Mich.	34,273	Wichita, Kans.	72,217
Davenport, Ia.	56,727	Little Rock, Ark.	65,142	Port Huron, Mich.	25,944	Wichita Falls, Tex.	40,079
Dayton, O.	152,559	Long Beach, Calif.	55,593	Portland, Me.	69,272	Wilkes-Barre, Pa.	73,833
Decatur, Ill.	43,818	Lorain, O.	37,295	Portland, Oreg.	258,288	Williamsport, Pa.	36,198
Denver, Colo.	256,491	Los Angeles, Calif.	576,673	Portsmouth, O.	33,011	Wilmington, Del.	110,168
Des Moines, Ia.	126,468	Louisville, Ky.	234,891	Portsmouth, Va.	54,387	Wilmington, N.C.	33,372
Detroit, Mich.	993,678	Lowell, Mass.	112,759	Poughkeepsie, N.Y.	35,000	Winston-Salem, N.C.	48,395
Dubuque, Ia.	39,141	Lynchburg, Va.	30,070	Providence, R.I.	237,595	Woonsocket, R.I.	43,496
Duluth, Minn.	98,917	Lynn, Mass.	99,148	Pueblo, Colo.	43,050	Worcester, Mass.	179,754
East Chicago, Ind.	35,967	McKeesport, Pa.	46,781	Quincy, Ill.	35,978	Yonkers, N.Y.	100,176
East Cleveland, O.	27,292	Macon, Ga.	52,995	Quincy, Mass.	47,876	York, Pa.	47,512
Easton, Pa.	33,813	Madison, Wis.	38,378	Racine, Wis.	58,593	Youngstown, O.	132,358
East Orange, N.J.	50,710	Malden, Mass.	49,103	Reading, Pa.	107,784	Zanesville, O.	29,569
East St. Louis, Ill.	66,767	Manchester, N.H.	78,384	Revere, Mass.	28,823		

POPULATION OF PRINCIPAL FOREIGN CITIES

NORTH AMERICA

	Year	Population
British America		
Calgary	1916	56,514
Edmonton	1916	53,846
Halifax	1911	46,619*
Hamilton	1919	108,143
Montreal	1917	700,000*
Ottawa	1919	107,732*
Quebec	1917	103,000*
St. John	1920	61,380*
Toronto	1919	499,278
Vancouver	1919	115,000*
Victoria	1919	39,500*
Winnipeg	1919	163,000
Central America		
Guatemala	1910	90,000*
Leon	1920	73,520
Panama	1917	61,369
San Salvador	1920	80,100
Mexico		
Guadalajara	1910	119,468
Mexico	1921	615,367
West Indies		
Camagüey	1919	98,193
Habana	1919	363,506
Kingston	1911	57,379
Port au Prince	1914	100,000
San Jùan	1920	70,707
Santiago de Cuba	1919	70,232

SOUTH AMERICA

	Year	Population
Argentina		
Buenos Aires	1920	1,674,000*
Córdoba	1918	156,000*
Rosario	1914	222,592
Bolivia		
La Paz	1918	107,252*
Sucre	1918	29,686*
Brazil		
Belem (Pará)	1913	275,167*
Recife (Pernambuco)	1913	216,484*
Rio de Janeiro	1920	1,157,873*
São Paulo	1919	504,300*
São Salvador (Bahia)	1913	348,130*
Chile		
Santiago	1919	424,993
Valparaiso	1919	218,465
Colombia		
Barranquilla	1918	66,107
Bogotá	1918	143,994
Ecuador		
Guayaquil	1919	93,851
Quito	1915	70,000*
Guiana		
Cayenne	1918	13,527
Georgetown	1919	53,580*
Paramaribo	1920	36,038
Paraguay		
Asunción	1920	99,836*

* Estimated.

	Year	Population
Peru		
Arequipa	1913	37,500*
Callao	1913	36,000*
Lima	1919	175,000*
Uruguay		
Montevideo	1920	361,950
Venezuela		
Caracas	1915	86,880*
Maracaibo	1915	48,500*
Valencia	1915	54,387*

EUROPE

Austria		
Gratz	1920	157,032
Vienna	1920	1,842,005
Balkan States		
Athens	1915	170,000*
Constantinople	1916	1,000,000*
Saloniki	1915	157,889*
Sofia	1910	102,812
Baltic States		
Reval	1917	160,000
Riga	1913	569,100
Vilna	1920	205,000
Belgium		
Antwerp	1919	322,857
Brussels	1919	685,268
Ghent	1919	165,655
Liège	1919	166,697
British Isles		
Birmingham	1921	919,438
Bradford	1921	285,979
Bristol	1921	377,061
Cardiff	1921	200,262
Dublin	1919	399,000*
Dundee	1919	185,388
Edinburgh	1919	338,060*
Glasgow	1919	1,113,454*
Leeds	1921	458,320
Liverpool	1921	803,118
London	1921	4,483,249
Manchester	1921	730,551
Sheffield	1921	490,724
Czechoslovakia		
Brünn	1914	131,800*
Prague	1914	541,500*
Denmark		
Copenhagen	1916	506,390
Finland		
Helsingfors	1919	187,544
France		
Bordeaux	1911	261,678
Havre	1911	136,159
Lille	1911	217,807
Lyon	1911	523,796
Marseille	1911	550,619
Nantes	1911	170,535
Paris	1911	2,888,110
Germany		
Berlin	1919	1,902,509
Cologne	1919	633,904
Dresden	1919	529,326
Hamburg	1919	985,779
Leipzig	1919	604,380
Munich	1919	630,711
Hungary		
Budapest	1920	1,184,616
Italy		
Florence	1915	242,147*
Genoa	1915	300,139*
Milan	1915	663,059*
Naples	1915	697,917*
Palermo	1915	345,891*
Rome	1915	590,960*
Trieste	1914	246,500*
Turin	1915	451,994*
Venice	1915	168,038*
Jugoslavia		
Belgrade	1919	120,000
Zagreb	1919	80,000
Netherlands		
Amsterdam	1919	647,120
Rotterdam	1919	506,067
The Hague	1919	359,610
Norway and Sweden		
Bergen	1920	90,960*
Christiania	1920	263,713*
Göteborg	1920	200,577
Stockholm	1920	415,201
Poland		
Krakow	1920	176,463
Lemberg	1914	212,000*
Lodz	1920	429,775
Warsaw	1920	980,000
Portugal		
Lisbon	1911	435,359
Oporto	1911	194,009
Rumania		
Bucharest	1917	308,987
Russia		
Moscow	1919	1,121,000*
Petrograd	1915	2,318,643
Spain		
Barcelona	1918	618,766*
Madrid	1918	652,157*
Valencia	1918	245,162*
Switzerland		
Basel	1920	135,976
Geneva	1920	135,059
Zürich	1920	207,161
Ukraine		
Kiev	1913	610,190
Odessa	1912	631,040
Free City of Danzig		
Danzig	1919	194,953*
Free State of Fiume	1910	49,806

ASIA

Central Asia		
Bokhara	1920	75,000*
Khiva	1920	4,500*
Tashkend	1913	272,300
China		
Canton	1918	900,000
Hankow	1918	1,443,950
Peking	1918	1,000,000*
Shanghai	1918	1,000,000
Tientsin	1918	800,000
Dutch East Indies		
Batavia	1918	234,697
Surabaya	1918	160,801
French Indo-China		
Hanoi	1919	109,500
Saigon	1919	64,496
India		
Bombay	1911	979,445
Calcutta	1911	1,222,313
Delhi	1911	232,837
Hyderabad	1911	500,623
Lucknow	1911	259,798
Madras	1911	518,660
Rangoon	1911	293,316
Japan		
Keijo (Seoul)	1920	302,686
Kobe	1920	608,628
Kyoto	1920	591,305
Osaka	1920	1,252,972
Tokyo	1920	2,173,162
Yokohama	1920	422,942
Philippine Islands		
Manila	1918	286,613
Siam		
Bangkok	1918	541,000*
Siberia		
Irkutsk	1913	129,700
Omsk	1913	135,800
Tomsk	1913	116,664
Uralsk	1913	47,880
Southwest Asia		
Aleppo	1920	250,000*
Bagdad	1920	250,000*
Damascus	1920	250,000*
Erzerum	1918	80,000*
Jerusalem	1920	60,000*
Medina	1918	40,000*
Mekka	1918	80,000*
Smyrna	1918	375,000*
Teheran	1920	220,000*
Straits Settlements		
Singapore	1911	311,985

AFRICA

Alexandria	1917	444,617
Algiers	1912	172,397
Cairo	1917	790,939
Cape Town	1911	67,159
Fez	1919	109,189
Freetown	1911	34,090
Johannesburg	1911	237,104
Kimberley	1911	29,525
Monrovia	1920	6,000*
Port Said	1917	91,090
Tananarivo	1911	63,115
Tangier	1919	50,000
Tripoli	1911	73,000
Tunis	1911	176,500

AUSTRALIA AND NEW ZEALAND

Adelaide	1919	256,660
Auckland	1920	144,646*
Brisbane	1919	189,576*
Melbourne	1919	743,000*
Sydney	1919	828,700
Wellington	1920	100,898

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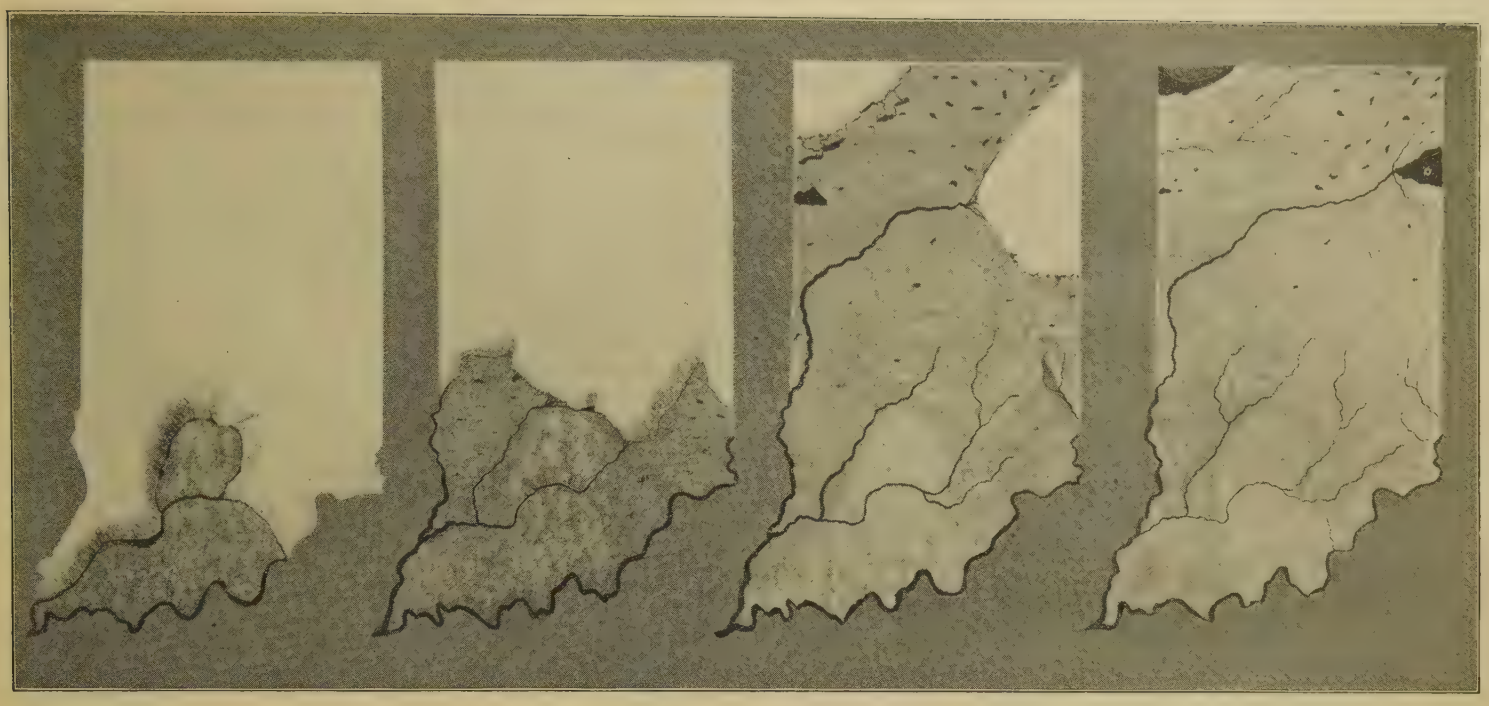

THE STATE OF INDIANA

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INTRODUCTION

We are proud of Indiana. Nature gave it great natural resources, and a fine, progressive sort of people came to use these gifts and make this state their home. The story of how nature and the 2,930,390 inhabitants have helped and hindered one another and will influence each other in the future is our chief interest in the study of the geography of Indiana.

Nature did much toward making Indiana a substantial and moderately progressive state by giving it a variety of resources. There is a favorable climate, an abundance of plant and animal life, good farming land, and valuable mineral resources. These gifts counterbalance each other and make our life normal and happy.

Furthermore, our life is affected by location with respect to the natural resources and the people of our sister states.

Problems of location. 1. In what part of the Central Plains is Indiana located? *See map on pages 2 and 3.* 2. Who are our neighbors? 3. Turn to page 82. Describe the location of Indiana with reference to the rainfall belts of the United States; with reference to the distribution of population in the United States. 4. Where has the center of population of the United States been during the last thirty years? *See Fig. 190.*

5. Using the map opposite page 82, locate Indiana with respect to the part of our country that is abounding in plant life. 6. Does Indiana's location between the Great Lakes and the Ohio River cause many trunk railway lines to cross the state? *See map between pages 95 and 98.* Of what importance is this?

The way in which nature made the natural regions of Indiana is shown in the series of pictures at the top of this page. Read about the continental glacier in the United States on pages 10 and 51. Thousands and thousands of years ago much of Indiana was hilly. Then the great ice-sheet shown in the first picture moved southward, covering almost all the state. How thick was the ice? What became of the plants and animals? What counties were not glaciated? They make up the hilly part of the state to-day. Then the ice melted away and plants and animals came back. Were they different from the former ones? This ice-sheet left a mantle of gravelly clay (ground moraine). Thousands of years later another ice-sheet came; but, as shown in the second drawing, it did not reach as far south as the earlier one. It deposited a mantle of gravelly clay on top of the mantle laid down by the earlier glacier. Why is the clay (ground moraine) in the southwest and the southeast not as thick as that in the central and northern parts of Indiana? Where did the water from the melting ice go? What great streams were born or reborn? Gradually the ice melted almost all away, as is shown in the third picture, and plants and animals came back again. What made the lakes? What did the streams do with the loose sand and gravel? The southern (older) part of the ground moraine is not as smooth as the younger part in the north, because it is thinner

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Longitude West from Greenwich
88°
87°
86°
85°
A
B
C
D
Grand Rapids
LAKE MICHIGAN
Chicago
Wheaton
DU PAGE
CANAL
DRAINAGE
Whiting
East Chicago
Indiana Harbor
Gary
Hammond
COOK
WILL
KANKAKEE
Kankakee
IROQUOIS
Watseka
VERMILION
Danville
Newport
Peking
Des Moines
Salt Lake City
Constantinople
Madrid
Washington
New York
BERRIEN
CASS
ST. JOSEPH
BRANCH
HILLSDALE
Niles
Cassopolis
Sturgis
Michigan City
LAPORTE
PORTER
LAKE
JASPER
NEWTON
BENTON
WARREN
FOUNTAIN
PARKE
South Bend
Mishawaka
ST JOSEPH
Elkhart
ELKHART
LAGRANGE
STEUBEN
WILLIAMS
DEFIANCE
PAULDING
Ft. Wayne
ALLEN
WHITLEY
NOBLE
DEKALB
KOSCIUSKO
MARSHALL
STARKE
PULASKI
FULTON
WHITE
CASS
Logansport
WABASH
HUNTINGTON
WELLS
ADAMS
VAN WERT
MERCER
PAULDING
MIAMI
CARROLL
Kokomo
HOWARD
GRANT
BLACKFORD
JAY
TIPPECANOE
Lafayette
CLINTON
TIPTON
Frankfort
DELAWARE
Muncie
RANDOLPH
DARKE
GREENE
MONTGOMERY
Crawfordsville
BOONE
HAMILTON
Anderson
MADISON
HENRY
Newcastle
WAYNE
Richmond
HENDRICKS
MARION
INDIANAPOLIS
HANCOCK
Greenfield
Danville
Elwood
Marion
Huntington
Wabash
Peru
Logansport
Frankfort
Lafayette
Crawfordsville
Anderson
Muncie
Newcastle
Richmond
Greenfield
Kankakee
Danville
Watseka
Kentland
Rensselaer
Monticello
Delphi
Winamac
Knox
Plymouth
Rochester
Wabash
Huntington
Columbia City
Warsaw
Goshen
Elkhart
Angola
Auburn
Kendallville
Albion
Wolcottville
Topeka
Lagrange
Sturgis
Coldwater
Hillsdale
Jonesville
Coldwater
Bronson
Quincy
Union City
Portland
Winchester
Hartford City
Marion
Kokomo
Tipton
Noblesville
Greenfield
Shelbyville
Franklin
Edinburgh
Columbus
Seymour
Madison
Vincennes
Terre Haute
Brazil
Clinton
Rockville
Crawfordsville
Lafayette
Monticello
Rensselaer
Kankakee
Watseka
Danville
Champaign
Urbana
Decatur
Fort Wayne
Auburn
Angola
Coldwater
Bronson
Hillsdale
Jonesville
Quincy
Union City
Portland
Winchester
Hartford City
Marion
Kokomo
Tipton
Noblesville
Greenfield
Shelbyville
Franklin
Edinburgh
Columbus
Seymour
Madison
Vincennes
Terre Haute
Brazil
Clinton
Rockville
Crawfordsville
Lafayette
Monticello
Rensselaer
Kankakee
Watseka
Danville
Champaign
Urbana
Decatur

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Fig. D1. This wheat scene is typical of the Central Drift Plain of Indiana. What conditions make this region excellent for producing grain, forage, and stock? Of what use are the wood-lots? Compare and contrast this view with Figs. 21, 77, 92. Locate the drift plain on the Resource Map (Fig. D8)

and the streams have had a longer time to carve it. Why have the lakes disappeared from the southern part? Finally the ice-sheet entirely melted away from Indiana, as shown in the fourth picture. Many belts of hummocks and hollows (terminal moraines) were left by the ice, especially in the north. Why are most of the lakes of Indiana in the north? Since the time shown in the fourth picture the streams have altered the surface of Indiana considerably. At last Indiana became clothed with plants and forests. Animals ran wild, including the buffalo and relatives of elephants. Finally men came.

Therefore it can easily be seen that nature has divided Indiana into three natural regions: the Northern Lake and Moraine region, the Central Drift Plain, and the Southern Hills and Rolling Land region.

Map studies. 1. What is a natural region? Consult the map on pages 2 and 3 and name the great natural region to which Indiana belongs. Into what three smaller natural regions is Indiana divided because of its variety of soil and surface? How large is each region in Indiana? *See Fig. D3.*

2. What part of southern Indiana was not covered by the glacier? 3. What are the natural boundaries of Indiana? Did they help to determine the size and shape of Indiana? 4. Consult the map between pages 95 and 98 and compare Indiana with its sister states as to size.

Problems. 1. Name the large cities located on the Wabash River; on the White River and its two tributaries; on the Ohio River; on Lake Michigan. 2. Name the more important cities not located on a river or lake. 3. What is the length of Indiana? What is its width?

4. How large is your county? 5. How did Indiana get its name? 6. Name the large cities on the Pennsylvania Railroad; on the New York Central; on the Chicago and Eastern Illinois.

Home work. 1. Using the map on page 45, estimate the distance and direction in a straight line from Indianapolis to the capitals of the states bordering Indiana. 2. Using the map between pages 95 and 98, do the same with respect to New York, New Orleans, Chicago, San Francisco, Seattle, and Galveston. How long does it take to travel to each of these places from Indianapolis?

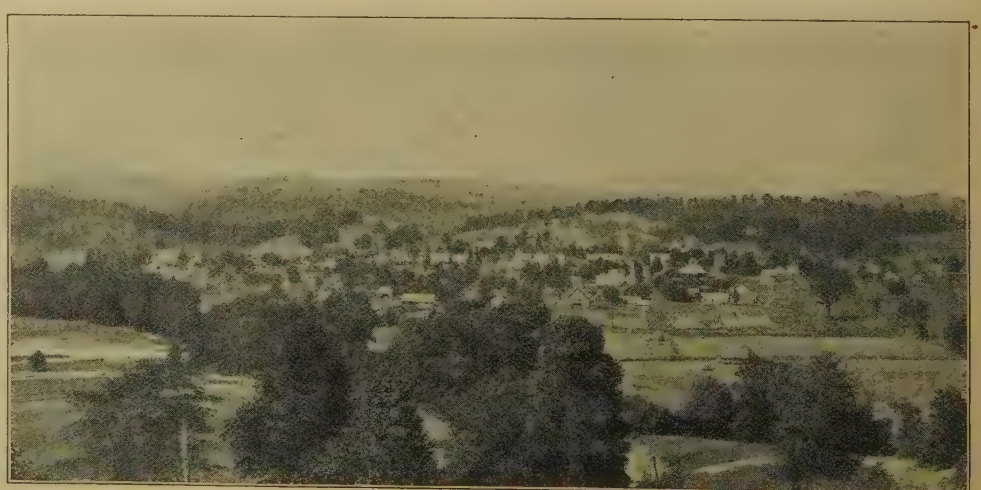
NATURAL REGIONS

Surface and soil. The Central Drift Plain is smooth and almost level. The Northern Lake and Moraine region is also a plain, but its surface is less smooth, for on it are some belts of low, hummocky hills, numerous lakes, and patches of sand hills intermingled with marshes. The Southern Hills and Rolling Land has a rougher surface than either of the other regions. Unglaciated hills and valleys compose the central section of southern Indiana, which is the most rugged portion of the state. The southeast and southwest sections are rolling. Almost all of Indiana is productive, the Central Drift Plain being the richest.

Settlement. The pioneers from Virginia and the other South Atlantic states were the first to migrate westward. The map on pages 2 and 3 shows that they crossed the Appalachian Highlands through Cumberland Gap and thus came to the Kentucky River, which led them to the Ohio River. Some of them crossed the mountains to Pittsburgh and thence floated down the Ohio. Thus the Ohio River caused Indiana to be settled first in its southern part and by people from the South. They brought Southern customs, institutions, and politics.

The map on pages 2 and 3 shows that settlers also moved westward from New England and the Middle Atlantic states to Buffalo, and thence by the Great Lakes to northern Indiana. Thus nature helped to settle northern Indiana with New Englanders, who had different customs and ideas from the Southerners.

As time went on the pioneers of southern Indiana moved northward along the rivers, and those of northern Indiana moved southward. Immigrants came from Europe. They all met in the Central Drift Plain, and the state and people, by give and take, were welded into



Courtesy of E. R. Cummings

Fig. D2. Nashville, snug among the hills of Brown County, is typical of the hill-and-valley section of unglaciated southern Indiana. How high are the hills above the basin? Why is the land rough? Why is the forest prominent? How much of the land seems to be cultivated? Are there any railroads? *See Transportation Map, Fig. D14.* Consult the Resource Map, Fig. D8, and report on the soils of southern Indiana

a many-sided commonwealth. This is another reason why Indiana is substantial and moderately progressive.

Hunter-farmers. The southern pioneers along the Ohio River found almost all of Indiana covered with a wonderful forest abounding in game. They became hunter-farmers, making use of nature's forest gift as hunters and laboriously clearing the forest to use her agricultural gift as farmers. The children were educated in the school of life, helping their fathers and mothers.

Farmer-rivermen. Presently the clearings became larger and larger, and the farmers had a surplus of products to sell. They used nature's gift of rivers. Thus they became farmer-rivermen, floating their goods down the Wabash, Ohio, and Mississippi rivers, and later making use of the canals. They were in need of some book-learning; therefore the Hoosier Schoolmaster appeared, teaching the three R's. The northern marshes were hard to drain and bred malaria. The Central Drift Plain was far from the Ohio. Thus southern Indiana was the most productive part of the state.

Farmer-railroaders. Later railroads were built, especially on the smooth land, and steamboat traffic declined. The great forests gradually disappeared, and the Central Drift Plain became the richest part of the state. Cities grew. Two-roomed schools appeared.

Farmers, miners, and manufacturers. Later oil and gas were discovered northeast of Indianapolis, and many of the farmers turned manufacturers and came to live in the towns and cities. This fuel gift of nature was used lavishly, and it gave out. But coal-mining developed in southwestern Indiana, and the coal was shipped to almost all parts of the state. Thus factories spread largely throughout Indiana. Workmen in the factory did not own the shop and the material, as the farmer owns his land and crops, and their children could not learn from their workmen-parents how to make a living. Therefore the many-roomed school was born.

Urban and rural population. To-day there are more city people in Indiana than country folk, because of the use which the people of Indiana are making of nature's gifts. The manufactured products outvalue the crops. More and more the schools teach the children how to make a living by art, science, commerce, domestic economy, manual training, and agriculture.

Natural regions to-day. Now study Fig. D3 and state in your own words what use the people in each natural region are making of nature's gifts. Tell about (1) the use of the land; (2) the crops; (3) the live stock; (4) the value of the taxable property; and (5) the population. Study also the Transportation Map (Fig. D14) and describe the transportation facilities of each region.

Problems. 1. Why were there hunter-farmers in Indiana long before there were coal miners? before there were cities? 2. What one of the three natural regions has the greatest variety of surface? of resources? 3. How does the scenery of each region differ from that of each of the others? 4. Plan an automobile trip through Indiana that you think would be interesting. 5. Wherein would Indiana be different if the glaciers had never come?

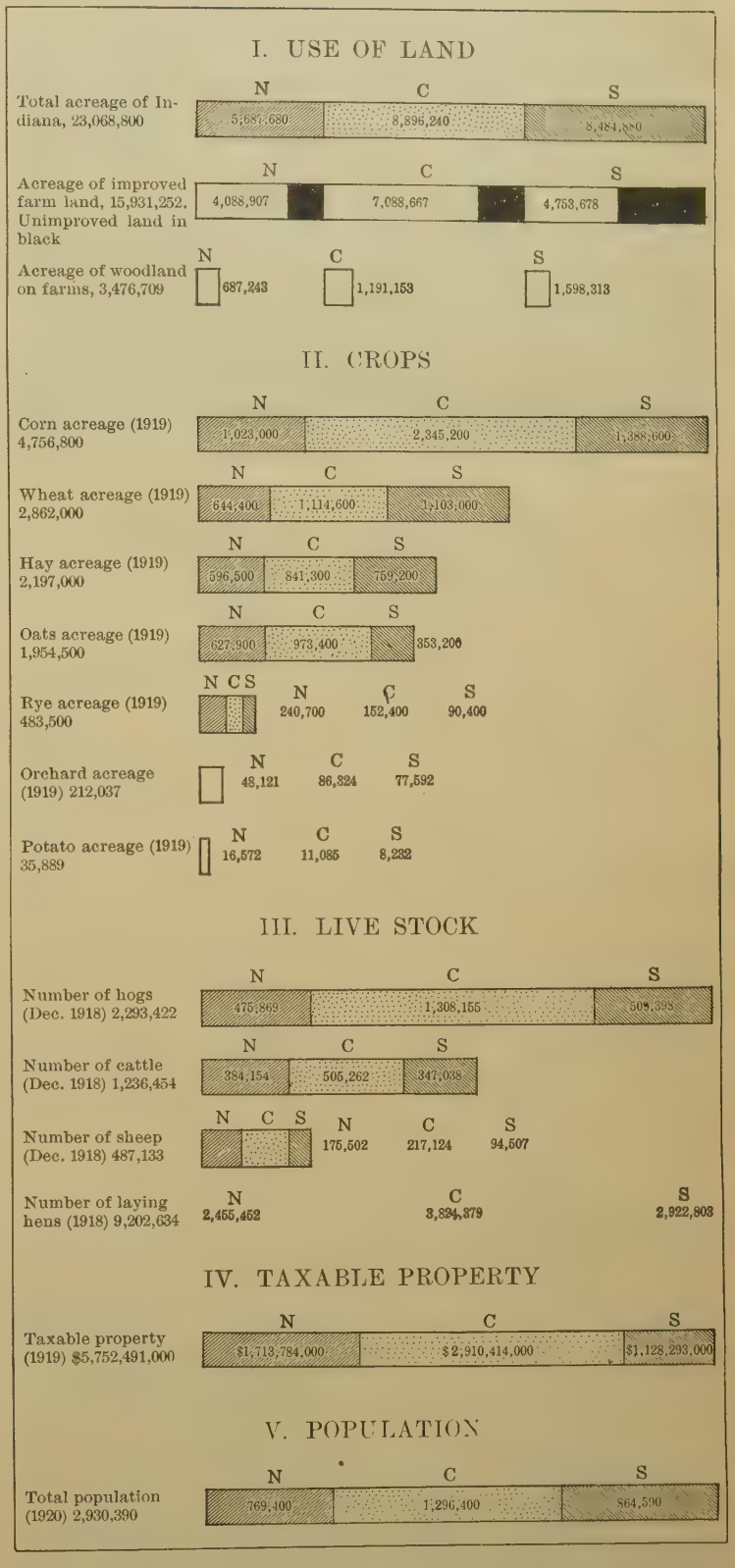


Fig. D3. These graphs show what use the people have made of the three natural regions of Indiana. N stands for the Northern Lake and Moraine region, C for the Central Drift Plain, and S for the Southern Hills and Rolling Land. How large is each region? How many acres of improved land does each region contain? unimproved land? farm wood-lots? Is forest conservation needed in Indiana? What region raises the most corn? wheat? oats? rye? hay? potatoes? orchard fruits? live stock? What per cent of the total acreage devoted to each crop is found in the natural region in which you live? How wealthy is each natural region? How many people live in each natural region?

Courtesy of Purdue University Experiment Station

Fig. D4. The hogs in this picture are foraging on alfalfa. Thus they grow fat, clean, and healthy. The alfalfa enriches the soil by the addition of nitrogen, and the long roots check soil wash. ***Read page 282 carefully.*** **Alfalfa is being introduced extensively in southern Indiana. What are the chief hog-producing states?** ***See Fig. 87***

AGRICULTURE IN INDIANA

Agriculture will always be the fundamental industry in Indiana. The production of food in the state has kept pace with the increase in population. In 1919 about 4,700,000 acres were devoted to King Corn, 2,900,000 acres to wheat, 2,200,000 to hay, and 2,000,000 to oats. These crops constitute the Big Four for Mr. and Mrs. Farmer. They also grew about 480,000 acres of rye, tended 200,000 acres of orchards, and harvested 35,000 acres of potatoes and 13,000 acres of tobacco. Despite a decreasing country population they also took care of about 2,300,000 hogs, 1,200,000 head of cattle, 480,000 sheep, and 9,200,000 laying hens. Improved machinery, transportation, and more scientific agriculture made this possible. For example, in 1920 Indiana farms were estimated to have nearly 20,000 tractors. *Do not memorize these statistics.*

Corn and swine. The smooth surface and rich soils of the state, combined with a rainy growing season characterized by hot days and warm nights, are nature's contribution for corn. Corn is grown on more than nine tenths of the farms of the state, and most of it is fed to hogs.

Wheat and oats. Wheat has a general distribution. Oats and winter wheat are grown on more than half of the farms of the state. Oats is used as a rotation crop for corn and wheat. Corn, wheat, and oats give rise to an extensive grain-elevator business and to flour and grist mills. Indianapolis is a great grain market, ranking second to Chicago in corn.

Hay and cattle. Hay is widely distributed. Stock-raising is associated with hay and forage crops and gives rise to widespread dairying industries.

Other farm products. Sheep are equally distributed in the north and the central part, but are less numerous in the hilly south. Despite the increase in automobiles and tractors, horses have held their own in Indiana, while the use of mules has steadily increased in the hills and flood plains of southern Indiana.

More than half of the potatoes are produced in the north, being favored by the sandy and gravelly loams and the hummocky terminal-moraine surface. Rye grows chiefly in the sandy patches of the north. Fruit and poultry are found in nearly all sections of the state. Fruit and vegetables give rise to many small canning establishments. Tobacco is confined almost entirely to fertile portions of the Ohio River counties.

Problems. 1. What region in Indiana is best suited to agriculture? to stock-raising? to fruit-growing? to gardening? Why? 2. What areas need draining by ditches? by tiles? Is this being done? 3. What parts of the state are best suited to reforestation? Is this being done? 4. How is the farmer helped by the manufacturer? by the banker? by the railroads? by the grain markets? by the retail stores? by the coal miners?

MINING AND WATER-POWER IN INDIANA

Indiana's mineral and water-power resources are considerable, but they do not compare with the agricultural resources. In 1917 the state produced almost $73,000,000 worth of mineral products, and in a recent year some 495 water-power wheels were operating in Indiana; at that time it was estimated that the water-power of the state amounted to nearly 30,000 horse power.

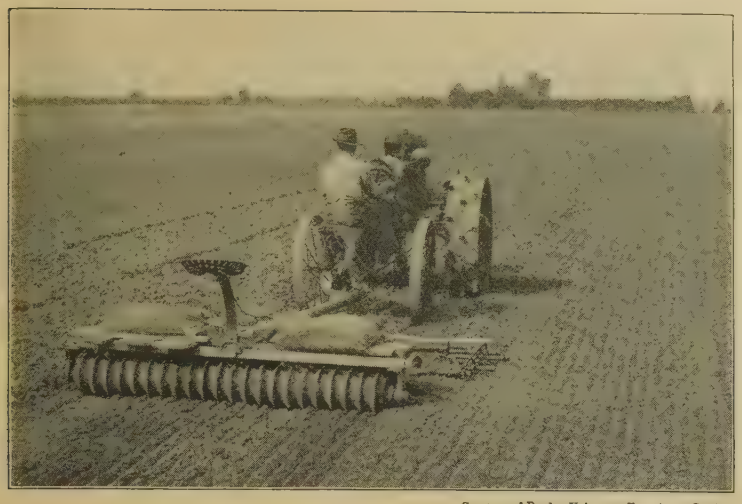
In a recent year the mineral products of the state ranked as follows: coal, clay, limestone, sand and gravel, petroleum, natural gas, and mineral waters.

Coal. The leading coal counties in order of production in 1919 were Vigo, Vermilion, Sullivan, Knox, Greene. Some 22,000,000 tons of coal were mined in Indiana in 1919, about two thirds of which was consumed in Indiana, the rest being shipped to other states. Wages paid amounted to about $32,000,000.

Most of the coal is dug by means of deep shafts (Fig. 41), some by means of hillside tunneling, and some by stripping off with steam shovels the eight to fifteen feet of shale and clay overlying the upper layers near the margin of the coal area. Almost all the coal is bituminous, about one per cent being block coal. *See Figs. 561, 562, 563, and read carefully pages 286 and 287.*

Courtesy of Purdue University Experiment Station

Fig. D5. Combined grain and stock farming is a profitable business in Indiana and is growing. The pasture, grain, and forage of the farm are largely used to feed the cattle. Note the four silos in which the forage is kept green for winter use. What becomes of the cattle? ***See Fig. 89***



Courtesy of Purdue University Experiment Station

Fig. D6. This man is harrowing, pulverizing, and working down his river-bottom land. The tractor also drew the plow and will be used in harvesting the wheat crop. Such lands also produce enormous crops of corn. Why are the river-bottom lands so fertile? Locate such lands on the Resource Map (Fig. D8). Compare with Figs. 48, 77, 92, 295

Coal gives rise to an extensive transportation business, involving thousands of men and millions of dollars. It is also the basis of an important wholesale and retail business. **Terre Haute** is the chief financial and distributing center of coal in Indiana.

Among other important mining or distributing centers are **Clinton, Brazil, Linton, Sullivan, Seelyville, Staunton, Bicknell, Evansville, Boonville, Dugger, Shelburn, Jasonville, Patricksburg,** and **Clay City.** What are the transportation facilities of each of these places?

Building stone. Indiana is well supplied with workable quarries of building stone. It produces about 40 per cent of the building stone of the United States. Along the eastern border of the coal area is sandstone suitable for foundations and bridge piers. Limestone is extensively quarried in southern Indiana. The important product of lime exceeds 100,000 tons annually. Among the important centers of production are **Mitchell, Delphi,** and **Milltown.**

Bedford limestone (Indiana oölitic limestone) is exported from Indiana to Europe as well as to the large cities of the United States. **Bedford, Mitchell, Bloomington,** and **Oolitic** are important centers for the quarrying and carving of Bedford and Mitchell limestones.

Sand and gravel. Consult the Natural Resource Map (Fig. D8) and name the counties having large quantities of sand and gravel. These products are obtained from pits widely scattered throughout most of the state. Why is this fortunate for such industries as concrete work and road and railroad building?

The chief glass-sand deposits are in the northwest. **Terre Haute** and **Muncie** are examples of cities in which glass manufacturing is dependent upon accessible supplies of sand and coal.

Gas and petroleum. Consult the Natural Resource Map (Fig. D8) and report on the location of the more promising oil fields. Read the story of oil and gas on page 40 and also on pages 287 and 288.

ND

The eastern oil field of Indiana, except in the northeast, is nearing exhaustion, and thus far oil has been discovered only in isolated pools in the southwestern field. How are the oil and gas transported? **Whiting** is the center of the oil-refining business.

On the Population Map (Fig. D22) notice the numerous towns and cities northeast of Indianapolis. Their growth was greatly stimulated during the period of lavish utilization of the eastern gas and oil field between 1890 and 1910. Many of these manufacturing centers have been successful in substituting coal for the more volatile fuels. Among them are **Anderson, Muncie, Kokomo, Indianapolis, Marion, Connersville, Newcastle, Winchester, Richmond,** and **Elwood.**

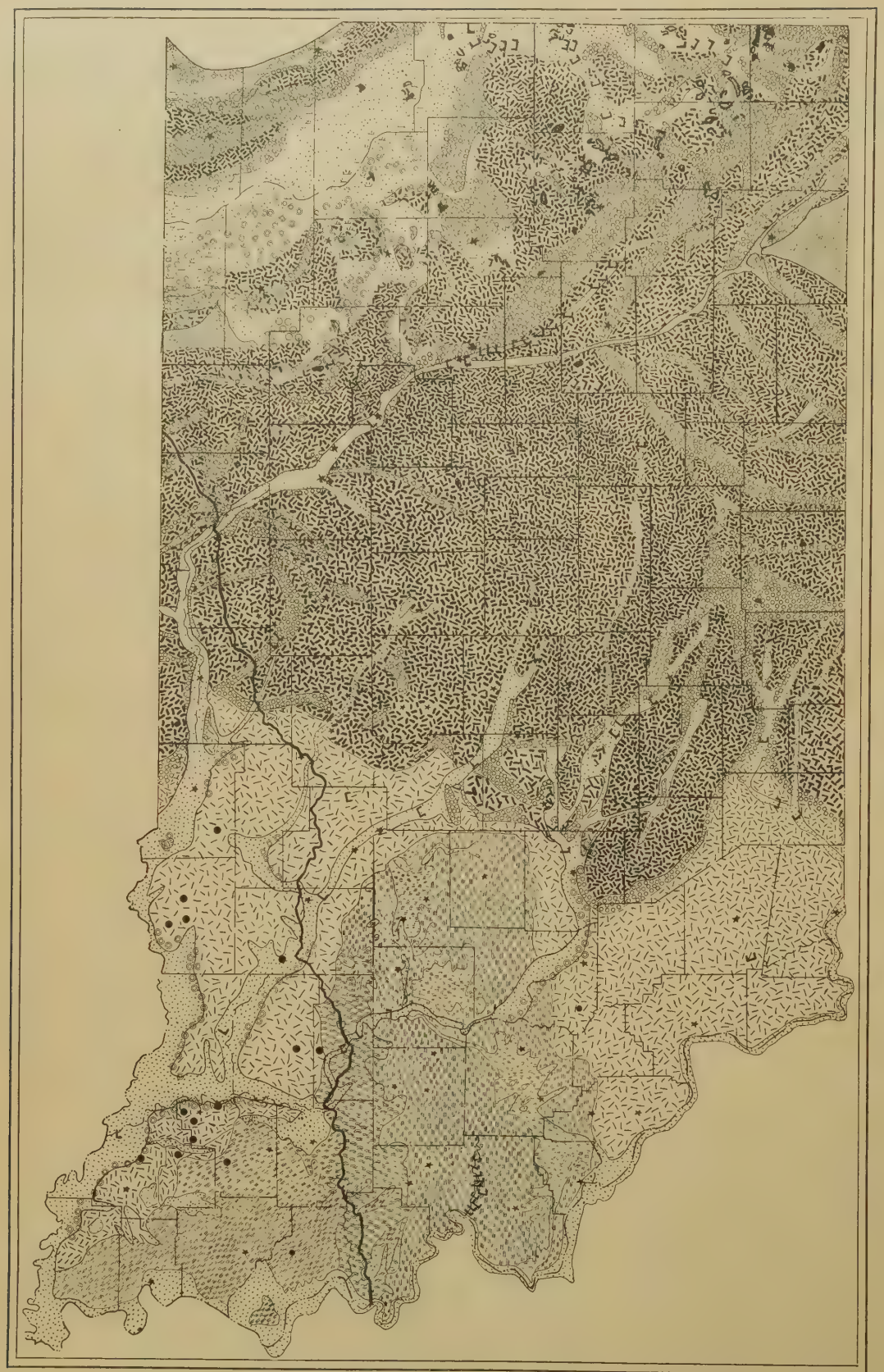
Water-power. Nature's gift of water-power to Indiana is a modest one, because the streams generally have wide valleys, gentle slopes, and variable volume. The most valuable sites are in the north, where the lakes act as natural storage basins and make for an even flow of water. Water-power is destined to grow in importance in Indiana with its increasing use in generating electricity. Some of the most valuable water-power developments in our state are at **South Bend, Elkhart, Mishawaka, Logansport, Goshen, Ontario, Williams, Brookville, Monticello,** and **Connersville.**

Effect of mineral resources. Without these minerals life in Indiana would be confined largely to agriculture; but commerce and industries, growing out of the agricultural and mineral resources, round out the life scenes and make them more interesting.

Problems. 1. Wherein would Indiana be different if there were no minerals in the state? What part of Indiana would suffer the most? 2. What region has the greatest variety of mineral resources? the least variety? 3. What one of these resources will last the longest? What one will be exhausted first? 4. Why does Indiana have a Department of Conservation? 5. Why did the farmer-rivermen use the water-power instead of the coal?

Courtesy of E. R. Cumings

Fig. D7. These are some of the famous Bedford limestone quarries which give Indiana first rank in the production of building stone in the United States. When first exposed to the air Bedford limestone is rather soft. The stone is quarried by channeling machines



LEGEND

1. Beds of old (extinct) lakes, drained thousands of years ago; chiefly silt and clay.
2. Sand, silt, and gravel laid down by rivers and lakes.
3. Gravelly clay, mixed by the glacier, from 100 to 200 feet thick.
4. Like 3, averaging 0–50 feet thick, somewhat enriched by loess loam; imperfectly mantling the bed rock.
5. Belts of sand, gravel, and gravelly clay, mixed in confusion by the glacier; surface strewn with hard bowlders.
6. Sand dunes; hillocks and hollows of sand blown by the wind.
7. Marshes and swamps, poorly drained.
8. Bed-rock soil, made by weathering, chiefly of shale and limestone, partly of sandstone.
9. Bed-rock soil, made by weathering, partly of Bedford limestone.
10. Bed-rock soil, made by weathering of sandstone.
11. Bed-rock soil, made by weathering of shale, sandstone, and limestone.
12. Deposits of lake marl, used in making cement and fertilizer.
13. Eastern margin of workable coal seams in Indiana.
14. Surveyed, developed water-power sites.
15. Surveyed, undeveloped water-power sites.
16. Wells and springs of mineral water.
17. The more promising petroleum fields.

Fig. D8. Map of Indiana showing Natural Resources

Map Studies. 1. What is meant by a map showing natural resources? 2. How does such a map differ from a map showing products? 3. Using the legend at the right on this page, locate on the map examples of all devices used to show the different natural resources of the state. 4. What natural resources are found in your own county? 5. From your own observation tell what uses are made of the natural resources of your county.

PROBLEM STUDY OF MAP SHOWING NATURAL RESOURCES

(Numbers refer to the different devices used on the map and explained in the legend on page viii)

1. These soils are composed of clay and fine-grained silt and are fertile. The surface is low and flat. Originally these areas were marshy and swampy. By tile drainage they are now being converted into rich lands, chiefly for the raising of corn and sugar beets. Where are these marketed?

2. Coarse dots are used to show these soils, because in general they are not as fine-grained as those of paragraph 1. Near the streams they are flood plains or bottom lands of fertile silt clay. These flood plains are nearly flat and produce excellent crops of corn, wheat, and other grains (Fig. D6). What counties have large areas of flood plains?

Farther away from the streams these coarse dots indicate benches of sand and gravel called terraces or second bottom lands. They are flat and easily cultivated, but are not as fertile as the flood plains. What counties have large areas of terrace land? Such soils are especially good for truck gardens.

The patches of coarse dots in the northern part of the state indicate sandy soils laid down in old glacial lakes, streams, and pools of water. In general they need the addition of humus to make them highly productive. They are best devoted to gardening, fruit-growing, stock-raising, and mixed farming. What counties have large areas of such soils?

Courtesy of Lighthouse Keeper Martin

Fig. D9. This sand dune is southwest of the lighthouse at Michigan City. How high is the top above the lake? The ruins of trees in the foreground were buried in drifting sand, which later was blown away. Such forests are said to be "resurrected." Name the dune areas of Indiana

3. These soils are thick and are composed of many kinds of rock ground into a grist by the glacier. Such an area is called ground moraine. Clay is the chief material, and the surface is smooth and nearly level, although there are some hard bowlders. These soils make the finest farming area of Indiana. They are suitable for all kinds of general farming and stock-raising. What counties are composed almost entirely of these soils?

4. These soils are like those of paragraph 3, except that they are not as thick and more fertilizer is needed for successful agriculture. What counties are largely made up of these soils?

5. These belts of sand and gravel were laid down at the margin of the ice while the margin was stationary. They are called terminal moraines. The surface is hummocky with hillocks and hollows. Such soils are best used for hay, stock-raising, and wood-lots. The gravel is of exceptional value for roads.

6. Double circles indicate areas of sand dunes (Fig. D9). Those with scant vegetation are constantly shifted about by the wind and are called "live dunes." Those held secure by vegetation are known as "dead dunes." The dunes are of little agricultural value, but they are a paradise to lovers of nature, because of their beauty. The dune sand is being utilized for railroad beds.

7. Slowly the marshes and swamps are being drained and changed into productive farming lands. Early settlers avoided these places. Why? What counties have marshes?

8. The soils of paragraphs 8, 9, 10, and 11 have not been laid down by the glaciers, streams, and lakes, but are made by the crumbling of the underlying bed rock. Because the surface is hilly, these soils are thin and easily washed away. The soils of paragraphs 8 and 9 are suitable for fruit-raising, stock-farming, and mixed agriculture. The steep hill slopes should be devoted to forests and alfalfa. What counties have such soils?

9. Bedford limestone, famous as building stone, underlies these soils in part and gives to Indiana first rank in the United States in the production of building stone. These soils are fertile, but in many places the land is hilly (Fig. D7). What counties have Bedford limestone?

10. These sandstones have been carved by streams into rugged land with steep slopes. Considerable fertilizer is needed for successful agriculture. Fruit should be grown and forests planted on the steeper slopes. The remainder is suitable for stock-raising and mixed farming.

11. These soils are much like those of paragraph 8, but they are underlain by coal. The shale rocks and the fire clay found under the coal seams (Fig. 41) are used for making brick and tile. Why is it an advantage to have the coal, shale, and clay all together?

12. Thousands of years ago small animals and minute plants, living in lakes of northern Indiana which are now extinct, caused the deposit of layers of marl. Some of the most important of these marl deposits are shown on the Resource Map (Fig. D8).

Vegetable matter, growing in these lakes, ponds, and marshes of northern Indiana, have given the state a resource of about 36,000 acres of peat.

13. West of this heavy black line are the workable coal beds of Indiana. There are more than thirty beds of coal in the state, nine of which are workable. The coal underlies an area of about 7000 square miles and amounts to about 50,000,000,000 tons. About 13,000,000,000 tons are workable. What counties are underlain by coal?

14 and 15. What counties have water-power sites which have been developed? What counties have undeveloped water-power sites? For what purposes is water-power used?

16. There are more than one hundred mineral springs and wells in Indiana. In what counties are they? Favorite watering places are French Lick, West Baden, Trinity Springs, Martinsville, and others. Why do people go to watering places?

17. Centuries ago oil and gas from decayed plants and bodies of animals accumulated under certain beds of rock in Indiana, hundreds of feet beneath the surface. Men have bored about 35,000 wells in the state to obtain this gas and oil. Probably only a small amount of it remains. Much of it was used and much was wasted. Where are the more promising fields? Can the gas and oil ever be replaced?

Home work. Write a brief composition to show how the soils, minerals, and waters of Indiana are valuable natural resources of the state. Have the people used their natural resources wisely?

MANUFACTURING IN INDIANA

For three quarters of a century, from the hunter-farmer stage through the time of the farmer-railroaders, the people of Indiana concentrated their efforts chiefly upon the forest and farm gifts of nature and did not manufacture extensively. Wood furnished raw material and fuel. Waterfalls were harnessed for power. With the water-power the millers ground the grain into flour. The turners and cabinetmakers made furniture and implements out of the wonderful forest products. Butchers slaughtered meat at hundreds of small places. The village blacksmiths laboriously forged iron, and the foundrymen painstakingly wrought and cast farm implements and household utensils. There were no great industrial centers, because wood was everywhere available, small water-power sites abounded, transportation was difficult, and few implements were demanded.

With the discovery and utilization of nature's gifts of gas, oil, coal, and stone resources, came the beginning of a great change in Indiana, — a change which is still in progress. Gradually the people of the state and their neighbors demanded more and more implements for their livelihood, and more manufactured articles for the enjoyment of life.

Much to our sorrow the magnificent forests have disappeared, sacrificed to meet the demands for agricultural land and the needs of the mills for lumber. Wood is now imported for manufacture. The butcher's shop has given place to a few great slaughtering and meat-packing centers. The wagon-maker and the blacksmith have developed into great implement and automobile manufacturing organizations. Tons of steel now represent the pioneer pounds of iron. More than half the people have moved to the cities and towns. This is all a normal outgrowth of the utilization of our natural resources.

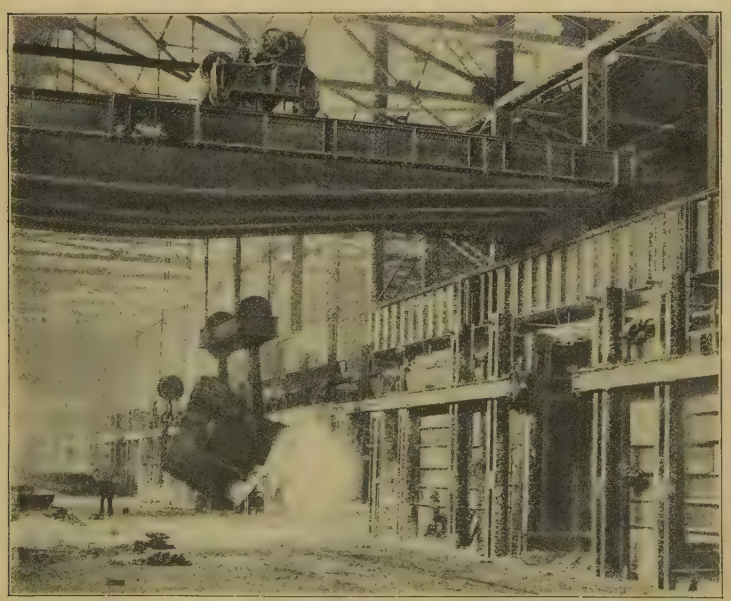


Fig. D10. The great vat in this picture contains tons of white-hot liquid iron, which is poured into furnaces and converted into steel. How is it handled? The red-hot steel is then rolled into railroad rails, sheets, and bars for use in the manufacture of steel implements throughout the Central Plains

Fig. D11. Kokomo is the birthplace of America's first mechanically successful automobile. These men are making aluminum motor crankcases in one of Kokomo's great automobile factories. What other products come from this busy city? From the Transportation Map, Fig. D14, report on the railroad facilities of Kokomo

Foodstuffs. That agriculture is still the fundamental industry in Indiana is emphasized by the fact that plant and animal products constitute our leading manufactures. These industries are widely scattered, save for slaughtering and meat packing, which is carried on extensively at **Indianapolis** and to a lesser extent at **Terre Haute, Hammond, Fort Wayne,** and **Evansville.** Important canning centers are **Hammond, Marion,** and **Brazil.** The transportation facilities of **Indianapolis** make this city the great bakery center of the state. Leading flour mills are located at **Evansville, Seymour, Terre Haute, Greensburg, Mt. Vernon,** and **Indianapolis.** The latter makes milling machinery.

Iron and steel. Tell the story of the phenomenal rise of **Gary** in response to geographical and industrial conditions (p. 41). **Gary** was created in a shifting waste of sand where there was not even a harbor.

Foundries are widely distributed in Indiana. Why? Steel and iron are converted into implements in industrial centers such as **Indianapolis, Fort Wayne, Kokomo, Terre Haute, East Chicago,** and **Hammond.** Sheet metal and castings are handled at **Crawfordsville.** Steel and wire mills are located at **Anderson** and **Kokomo. Hammond** and **East Chicago** have rolling mills. Stoves and furnaces are produced at **South Bend.**

Railroad cars and repair shops. Much railroad work is done at the railroad car shops, as, for example, the Baltimore and Ohio shops at **Washington,** the large shops of the Pennsylvania, and those of the Wabash and Nickel Plate at **Fort Wayne.** There are also repair shops at **Terre Haute, Peru, Hammond, Huntington,** and **Lafayette. Jeffersonville** manufactures freight cars.

Automobiles. Direct geographic factors are not as important in locating the automobile factories as are skilled labor, transportation facilities, marketing areas,

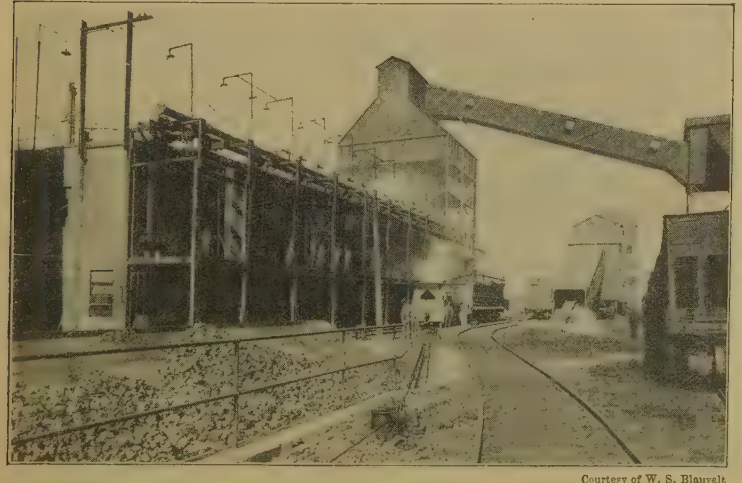
and other conditions (Fig. 76). Examples of automobile centers are **Indianapolis, Kokomo, South Bend, Anderson, Gary,** and **Newcastle.** Others are **Valparaiso, Peru, Muncie, Marion, Connersville, Logansport,** and **Auburn.**

Lumber products. Furniture plants are located at **Newcastle, Richmond, Seymour, Shelbyville, Columbus, Evansville, Greensburg, Michigan City, New Albany, Bluffton, Bloomington, Batesville,** and **Frankfort.**

Vehicles and wagons. These industries too are widely scattered. **South Bend** heads the list in total production. Vehicles are made at **Crawfordsville, Greensburg, Columbus, Lafayette,** and **Shelbyville.** Wheels are manufactured at **Anderson** and **Terre Haute.**

Stone. Indiana ranks second to Pennsylvania in the production of Portland cement, owing to marl deposits and to the Bedford and Mitchell limestones. *See Natural Resource Map, Fig. D8.* It takes 250 pounds of coal to manufacture 450 pounds of limestone or marl and 150 pounds of clay or shale into a barrel of cement. For this reason the cement plants of Indiana are located near the limestone and marl deposits, and the coal is brought to the plants from greater distances. There are cement plants at **Speeds, Mitchell, Buffington, Syracuse, Stroh,** and **Limedale. Buffington** uses furnace slag from **Gary** in making cement. Limestone quarries are found at **Bedford, Huntington, Peru,** and **Wabash.**

Textiles and clothing. Skilled and cheap labor are most important in the manufacture of these products. There are knitting mills at **Fort Wayne** and woolen mills at **Seymour.** Cotton goods are manufactured at **Evansville, Madison,** and **New Albany.** Clothing is made at **Terre Haute, Indianapolis, Jeffersonville, Michigan City, South Bend, Fort Wayne, Kokomo,** and **Portland.** Gloves and canvas are important manufactures of **Muncie.**



Courtesy of W. S. Blauvelt

Fig. D12. In this Terre Haute picture coal is dumped into the ovens on the left and baked. This baking produces gas for heating and lighting, coke for furnace use, and coal-tar by-products from which other valuable products are made. Among these are aniline dyes and carbolic acid

Fig. D13. On page 50 is told the story of South Bend and its great plow factory. What advantage has South Bend for distributing farm implements (*see Transportation Map, Fig. D14*)? for obtaining steel? for securing coal? What other farm implements are manufactured in South Bend?

Agricultural implements. **South Bend** ranks first in the production of plows and wagons (Fig. D13). Farming implements are also made at **Laporte, Lafayette, Richmond, Elkhart,** and **Mt. Vernon. Anderson, Marion,** and **Indianapolis** make tractors.

Paper. **Kokomo, Hartford City, Muncie,** and **Terre Haute** manufacture paper, chiefly from straw. **Marion** and **Terre Haute** make paper boxes; **Lafayette** and **Portland,** strawboard.

Ceramic products. Indiana is rich in glacial and fire clay, shale, and coal. Their occurrence, often in the same locality, has resulted in extensive brick, clay, and tile works at **Terre Haute, Mecca, Brazil, Crawfordsville, Bluffton,** and elsewhere. **Kokomo** makes pottery and plate glass. **Muncie** makes fruit jars. Glass products are produced at **Elwood, Hartford City, Marion, Vincennes,** and **Terre Haute.** Enameling is done at **Terre Haute.**

Leather. Shoes and leather come from **Huntington** and **New Albany.**

Tobacco. **Evansville** is noted for its tobacco products.

Miscellaneous manufactures. Skilled labor is important in the manufacture of electrical machinery and appliances. **Fort Wayne** produces all of the Edison Mazda lamps manufactured west of Pittsburgh and makes great quantities of general electrical apparatus. Electric meters are made at **Lafayette. Elwood** is famous for tin plate, which is also produced at **Muncie, Terre Haute,** and **Indianapolis. Elkhart** makes musical instruments. Copper products are made at **Indianapolis** and **Terre Haute. Kokomo** has brass works and manufactures stellite, which is used for making the points of cutting tools. **Bluffton** makes player pianos, and **Frankfort** kitchen cabinets. **South Bend** makes watches. Much zinc plate is manufactured in Indiana.

Problems. 1. What does the manufacturer do to the products which he receives from the farmer and the miner in order to make the raw products into finished articles? What part is played in this process by labor? by capital? by management? 2. Why is the manufacturer happy when crops are good? How do good crops affect the storekeeper? the railroad manager?

3. Why do food products rank first in the manufactures of Indiana? 4. How do our schools and colleges help the manufacturer? Why was manual training not taught in our schools in 1825? 5. Name kinds of business, such as banking, which are helped by the manufacturer. Do they help him in return? Does nature help the banker?

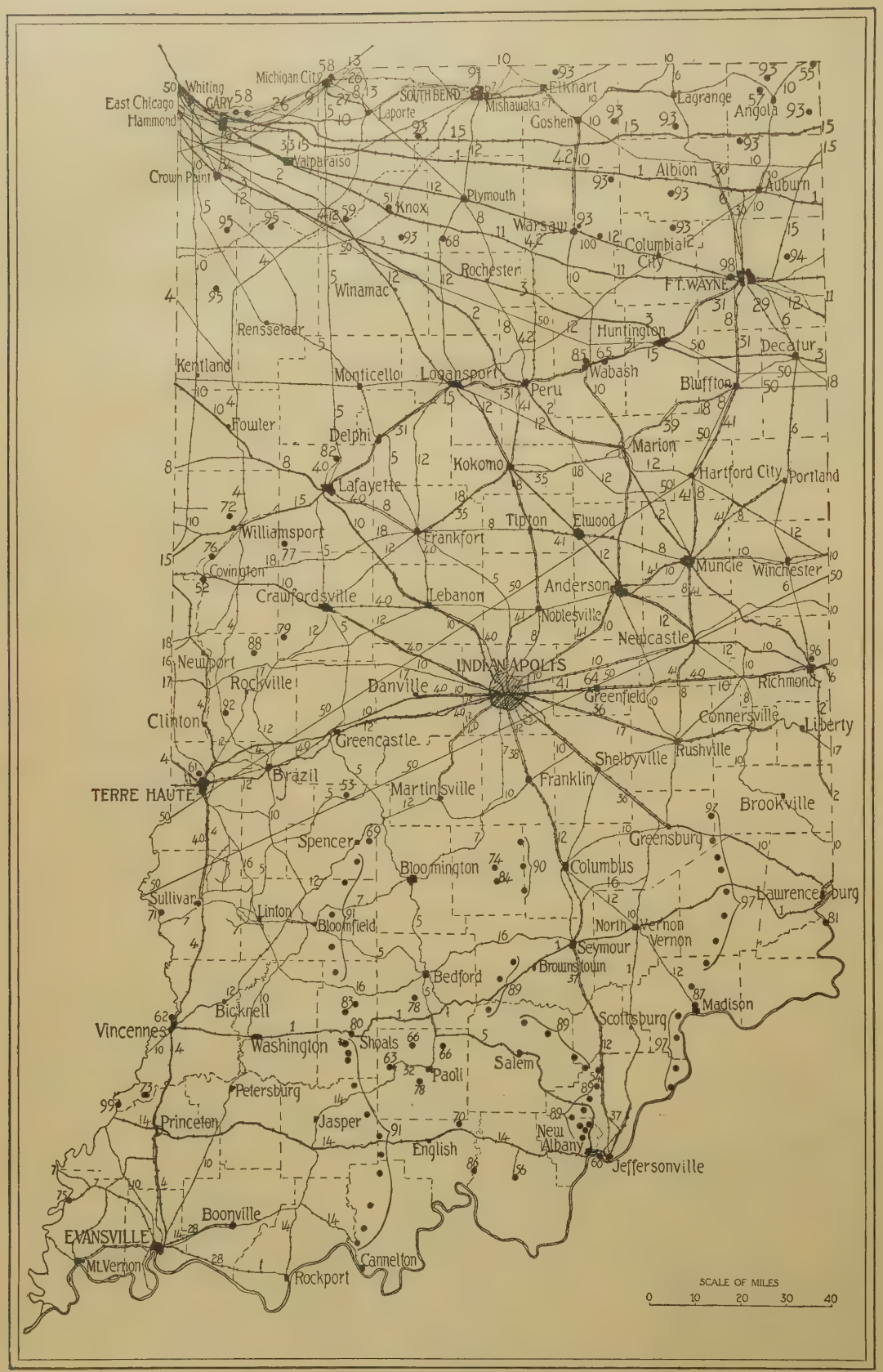


Fig. D14. Map of Indiana showing Transportation Lines

Railroad lines
Interurban electric lines
Oil pipe lines
Navigable rivers
Places of scenic interest

Numbers refer to the names given in the column at the right of the map

EXPLANATION OF NUMBERS

Railroad Lines. **1.** Baltimore and Ohio Railroad. **2.** Chesapeake and Ohio Railroad. **3.** Chicago and Erie Railroad. **4.** Chicago and Eastern Illinois Railroad. **5.** Chicago, Indianapolis and Louisville Railroad. **6.** Grand Rapids and Indiana Railroad. **7.** Illinois Central Railroad. **8.** Lake Erie and Western Railroad. **9.** Michigan Central Railroad. **10.** New York Central Railroad. **11.** New York, Chicago and St. Louis Railroad. **12.** Pennsylvania Railroad. **13.** Père Marquette Railroad. **14.** Southern Railroad. **15.** Wabash Railroad. **16.** Chicago, Terre Haute and Southeastern Railroad. **17.** Cincinnati, Indianapolis and Western Railroad. **18.** Toledo, St. Louis and Western Railroad.

Interurban Electric Lines. **25.** Beech Grove. **26.** Chicago, Lake Shore and South Bend. **27.** Chicago, South Bend and Northern. **28.** Evansville, Suburban and Newburgh. **29.** Fort Wayne and Decatur. **30.** Fort Wayne and Northwestern. **31.** Fort Wayne and Northern Indiana. **32.** French Lick and West Baden. **33.** Gary and Interurban. **34.** Gary and Southern. **35.** Indiana Railway and Light Company. **36.** Indianapolis and Cincinnati. **37.** Indianapolis and Louisville. **38.** Interstate Public Service Company. **39.** Marion and Bluffton. **40.** Terre Haute, Indianapolis and Eastern. **41.** Union Transit Company of Indiana. **42.** The Winona Interurban.

Underground Pipe Lines for Transporting Oil. **50.** Oil pipe lines.

Places of Scenic Interest. **51.** Bass Lake Fish Hatchery. **52.** Baltimore Heights. **53.** Cataract Falls. **54.** Clark County State Forest. **55.** Clear Lake. **56.** Old State Capital. **57.** Crooked Lake. **58.** Dunes. **59.** English Lake. **60.** Falls (rapids) of the Ohio. **61.** Fort Harrison. **62.** Fort Knox. **63.** French Lick and West Baden Springs. **64.** Greenfield, birthplace of James Whitcomb Riley. **65.** Hanging Rock. **66.** Lost River. **67.** La Salle's Portage. **68.** Lake Maxinkuckee. **69.** McCormick's Creek Canyon State Park. **70.** Marengo Cave. **71.** Merom Bluffs. **72.** Mudlavia Canyon of Pine Creek. **73.** Claypole Hills. **74.** Nashville Basin. **75.** New Harmony. **76.** Portland Arch. **77.** Shawnee Mound. **78.** Typical sink hole areas. **79.** Shades and Indian Creek. **80.** Water-power dam site; canyon; Jug Rock. **81.** Split Rock. **82.** Tippecanoe Battle Grounds. **83.** Trinity and Indian Springs. **84.** Weed Patch Knob. **85.** Wabash Dome. **86.** Wyandot Cave. **87.** Clifty Falls State Park. **88.** Turkey Run State Park. **89.** The Knobs. **90.** The Hills. **91.** The Bluffs. **92.** Raccoon Creek Gorge. **93.** Moraines and lakes of northern Indiana. **94.** Flats of extinct Lake Maumee. **95.** Kankakee Plain. **96.** Whitewater Gorge. **97.** Limestone escarpment. **98.** Maumee-Wabash Portage. **99.** Government dam. **100.** Winona Lake.

Map studies. 1. How are the railroads shown on the Transportation Map (Fig. D14)? 2. Using the explanation of the numbers at the right of the map, find the location of each railroad and give its name. 3. How are the interurban electric lines shown? Locate and name each one. 4. Where are the oil pipe lines? 5. What is meant by places of scenic interest? 6. The more important railroads are shown in heavier lines than the others.

Problems. 1. Consult the map between pages 95 and 98. Through what other states do the railroads which cross Indiana pass? 2. Why do the lines extend chiefly east and west? Of what importance is this? 3. Get railroad time-tables and tell what railroads would be used and how long it would take to travel from Indianapolis to Chicago; to St. Louis; to Cincinnati; to Cleveland; to Louisville; to Detroit. Do the same for each of the large cities of Indiana.

4. Report on the route and time needed to travel between Terre Haute and South Bend; Gary and Richmond; Evansville and Kokomo; New Albany and Lafayette; Brazil and Richmond. 5. How should you go from your home to each of ten of the interesting places of Indiana?

Home work. 1. What natural region of Indiana has most railroads? Why? What region has the fewest? Why? 2. Make a list of the cities of Indiana having two railroads; three; four. What cities have more than four railroads or interurban electric lines? 3. Write a composition of a hundred words on Indianapolis as a transportation center.

CITIES AND TRANSPORTATION

Various conditions give rise to towns and cities and cause their growth. The well-rounded nature of life in Indiana is shown by the widely differing causes for many of its urban centers. **Terre Haute** (High Land) was started because of its fine site. How the Wabash River made this site is a wonderful story. Thousands of years ago the ancient Wabash River cut a valley 6 miles wide and 200 feet deep. Note in Fig. D15 the old bed of the river, the old buried flood plain, and the old bluffs. Then the glacier came. Note the glacial drift about 50 feet deep on top of the solid bed rock beyond the east and west bluffs. Then the Wabash brought down much loose sand and gravel and nearly filled its ancient valley. There is more than 100 feet of sand and gravel under Terre Haute. Then the waters of the Wabash became clearer, and it began to cut away the sand and gravel as

Fig. D15. This drawing is a study of the site of Terre Haute. The Wabash River flows through the center with the bottom land chiefly on the left and the higher terrace land on the right. On the east and the west are the bluffs and the upland. The foreground shows a cross section along an east-west line

Fig. D16. The chief streets of Indianapolis focus upon The Circle and the Soldiers' and Sailors' Monument. The great stores and hotels cluster about and near The Circle. Why is Indianapolis used for many conventions? The city has grown, largely because of its being near Indiana's natural resources and because of its excellent transportation facilities

it is still doing. Where the river has cut we find the flood plain, or bottom land, covered with silt. This bottom land is about 50 feet lower than the terrace, which is the part not cut away. The terrace is level, for it was the bed of the river in glacial times. Can you see the old sand bars on it? **West Terre Haute** is built upon another small part of the terrace left standing on the flood plain.

The solid black lines show the railroad lines. How do they get down to the terrace from the bluffs on the east? How do they cross the flood plain? How do they climb out of the flood plain on the west? Of what use to the city is the railroad running south along the river?

The white lines show the street-car lines and the interurbans. How does one cross the river?

The broken black lines east of the river show the city boundary of Terre Haute. How does the sand cushion under the city protect it from earthquakes? Would the sand support "skyscraper" buildings?

Fort Wayne and **South Bend** grew at important portage points. (Between what waters?) **Indianapolis** and **Corydon** were initiated as political centers. Good locations on rivers created **Evansville, Vincennes, Logansport, Jeffersonville, Aurora,** and **Madison.** The intersection of railroad lines is a frequent cause for cities, as, for example, **Rushville, Greensburg,** and **Auburn. Michigan City** is an example of the influence of lake ports, while **Elkhart** and **Goshen** owe their start to water-power. **Lafayette** is the center of a rich farming district. Gas and oil spurred on **Anderson, Muncie,** and **Kokomo.** Explain the growth of **Gary. Spencer,** among beautiful hills, **Warsaw** and **Culver,** on charming lakes, and **West Baden, French Lick,** and **Trinity Springs** owe much to scenery. **New Harmony** was founded to carry out a social experiment. What led to the growth of **Evansville? Bedford? Whiting? Greencastle? Logansport? Frankfort? Gary? Marion?** Can you name any other causes for the growth of cities in Indiana?

Courtesy of L. P. Benezet

Fig. D17. Evansville has utilized the natural resource of its river site for beauty and recreation as well as for commerce and manufacture. Sunset Park belongs to the people. Some two hundred trees each bear a plate inscribed with the name of a Vanderburg boy who gave his life in the World War

Water or fuel power, access to raw materials, and good markets are of fundamental importance to cities. The element of transportation is becoming more vital every year. Therefore we should study carefully the transportation facilities of the natural regions of the state, the counties, and the cities. Increasing transportation facilities test a region or a city much as a boy is tested when he goes to a great city to live: they lay bare sources of strength and weakness.

Northern cities. These cities owe their importance in part to their location near Lake Michigan. They are also helped by the excellent transportation lines, reaching out to them from Chicago, Detroit, Columbus, Cleveland, and Indianapolis. Agricultural resources of the region are increasing, and considerable water-power is available.

As a group they are important for producing farm implements, steel and steel products, electrical appliances, oil products, and automobiles. They also rank high in the production of cement. They have important foundries, machine shops, and car shops.

From the Natural Resource, Transportation, and Population maps (Figs. D8, D14, and D22) locate and name each city of the Northern Lake and Moraine region with a population of 5000 or more. Discuss the transportation facilities of each city thus located. Find out the chief products and features of interest of each of these cities.

Central Drift Plain cities. Rich farming land and excellent transportation facilities in all directions from Indianapolis give the cities of this region a substantial footing. Gas and oil resources have aided them, and they are not far distant from supplies of coal.

Together these Central Drift Plain cities are important for flour-milling, slaughtering and meat-packing, and grain markets. They are noted for the production of automobiles, furniture, clothing, glass, and paper. Many of these cities have large machine shops and foundries.

For a study of the cities of this region follow the directions given for the study of the northern cities.

Southern cities. More varied influences affect the cities of the Southern Hills and Rolling Land than those of the regions to the north. The Wabash group of cities to the southwest is affected by that stream and its valley, by the rolling land and good farming facilities,

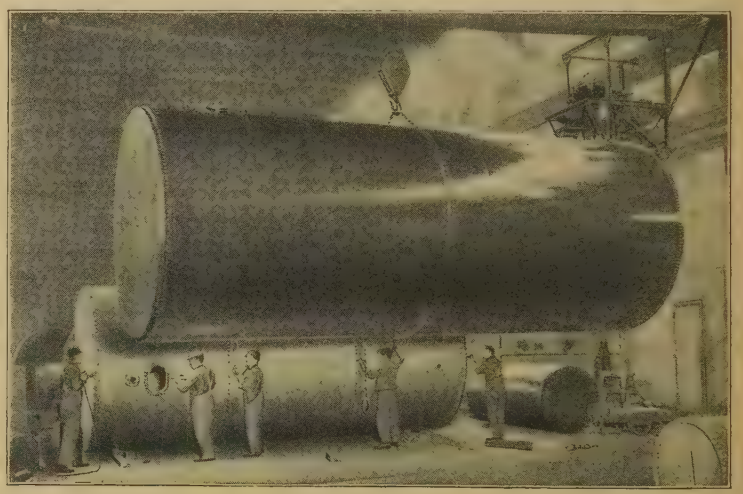


Fig. D19. Fort Wayne has an oil-tank manufacturing business of world-wide importance. These men are riveting a tank. This establishment also manufactures the self-measuring gasoline tanks at which you buy gasoline

and by the coal and clay resources. Transportation is good in all directions except southeast and southwest.

The cities of the unglaciated hilly section are handicapped by lack of adequate transportation. Why is this? The farm products are modest. The cities in part owe their growth to special resources (such as limestone), to water-power, and to local political importance. They are distributing centers for the surrounding farm lands.

Southeastern Indiana is only fairly well served by railroads. What counties are without them? The cities are chiefly farming centers, or centers of manufacture serving local areas. Some utilize water-power.

Southern Indiana is noted for coal and coke and for the associated industries of brick, tile, and pottery

Fig. D18. This Fort Wayne foundry and machine shop makes many of the freight-car wheels manufactured west of Pittsburgh. It also makes other heavy iron castings and machinery. Why are freight-car wheels made of iron? Why are they cast in one solid piece?

Courtesy of L. P. Benezet

Fig. D20. The growth of Evansville has always been closely related to the use of the Ohio River and Indiana's relations with the South. Unlike most river towns, Evansville was not stunted by the decline of the steamboat era. This is due largely to the city's good railroad connections north and south, to the coal fields, the good farming lands, and the enterprise of her citizens

manufacture. It calls to mind building stone, flour mills, foundries, and machine shops. There is also some meat-packing and manufacture of clothing.

Name, locate, and discuss these cities according to the directions given above.

Problems. 1. State why the following cities are important as interurban centers: Indianapolis, Fort Wayne, Kokomo, Terre Haute, Evansville, Muncie, South Bend. 2. From Terre Haute the following numbers of people in Indiana and Illinois can be reached by railroad train: in one hour, 218,000; in two hours, 855,000; in three hours, 1,568,000; in four hours, 2,510,000. What cities in Indiana do you think equal this record? surpass it?

3. What relation is there between the hunter-farmer boy and girl of olden days and the Boy Scouts? the Camp Fire Girls? Why do the boys of to-day play more organized games than the sons of the farmer-rivermen? Are they any happier?

INTERSTATE COMMERCE

Following is a list of commodities of which Indiana produces a surplus and sells to other states. Where do they go? Can you add to the list?

Foodstuffs: grain and flour; dairy products; meat; poultry and eggs; vegetables; canned goods.

Minerals: coal; stone; sand and gravel.

Manufactures: cement; brick and tile; pottery and glass; steel; wagons; plows; automobiles and trucks.

Following is a list of commodities which Indiana imports. Where do we get them? Can you add to the list?

Foodstuffs: tropical fruits; sugar; coffee; rice; cocoa; tea; fish.

Minerals: iron; marble; granite; copper; zinc; lead; oil.

Manufactures: steam and electric cars; rubber; leather; shoes; wool; silk; cotton; furs; clothing; paper; wood; chemicals; scientific instruments; paints; jewelry; motion pictures.

Why is it that as a state we buy just about as much as we sell? Who regulates this? How would Indiana be handicapped if it had to pay an import tax on all goods shipped into the state from other states? if it levied an export duty on all goods shipped out of Indiana to other states?

THE FUTURE

With 92 per cent of her land in farms, 80 per cent of her farm land improved, and much of her soil rich and of an enduring kind, the agricultural future of Indiana is assured. The mineral resources are sufficient to supply the state with fuel and raw materials for a long time.

These resources, together with excellent communications with other states, provide for a well-rounded development. No state with a lake front on the north and a great river front on the south and southwest, and crossed by most of the great railroads of the country, could become isolated. Indiana is likely to remain a moderately progressive, substantial commonwealth.

There is need for more careful utilization of our resources. Each gift of nature should be devoted to those ends to which it is best suited. For example, the rougher slopes should not be stripped of trees and abandoned, but should be devoted to forest, grass, and stock-raising.

It is probable that the northern part of the state, with its great trunk lines of transportation, will show the greatest development in the immediate future.

The urban population of the state will probably continue to outstrip the rural population (Fig. D22).

Fig. D21. This is the interurban station and office building at Indianapolis. On the left is the dome of the State House. Consult the Transportation Map (Fig. D14) and report on the number and names of the railroads and interurbans which enter Indianapolis. Obtain an automobile road map and report likewise concerning important roads

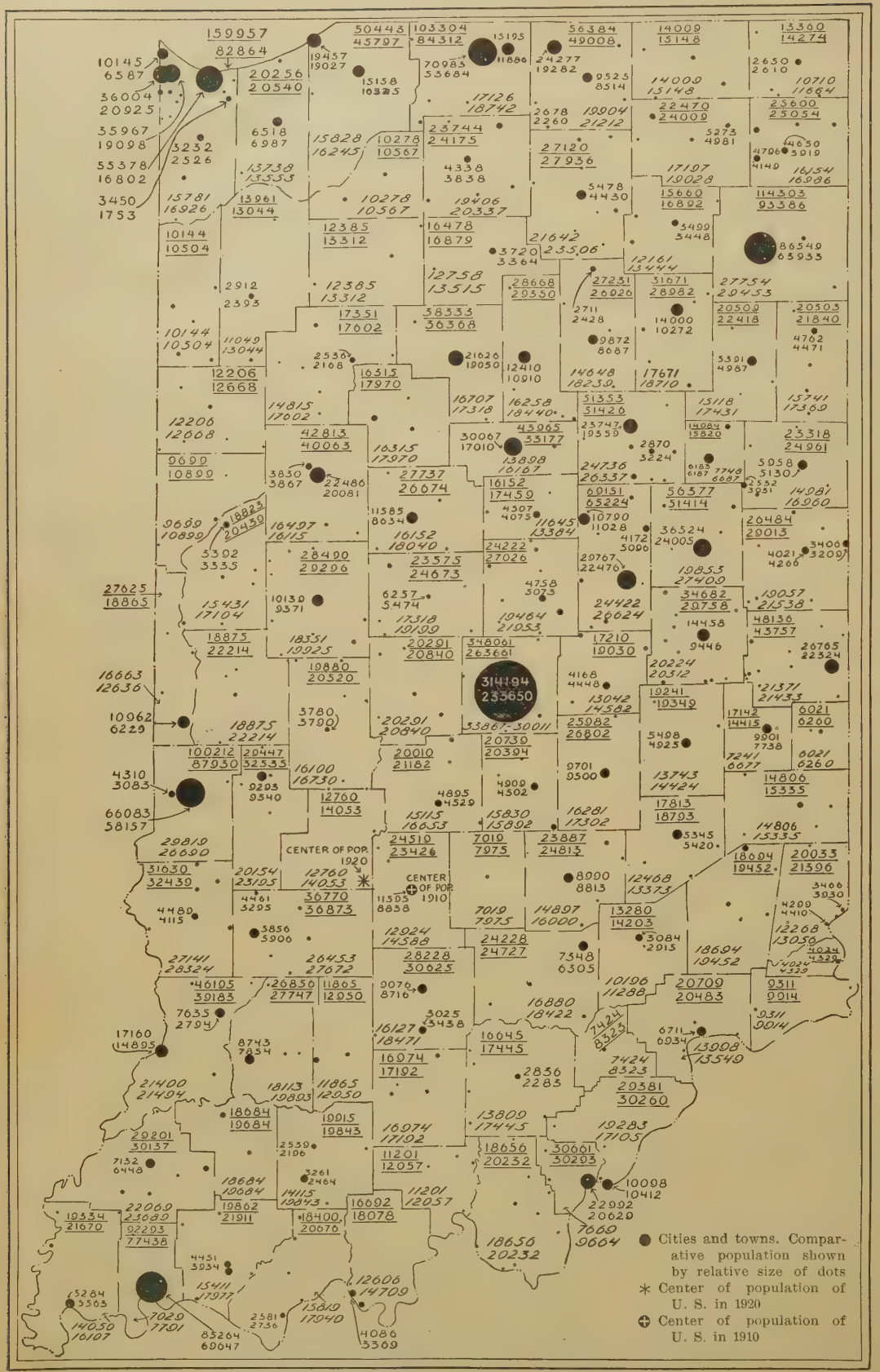

CENTER OF POP. 1920
CENTER OF POP. 1910
Cities and towns. Comparative population shown by relative size of dots
* Center of population of U. S. in 1920
Center of population of U. S. in 1910

Fig. D22. Map of Indiana showing Distribution of Population

Total population of counties shown thus:	50,443	(1920 figures above)
	45,797	(1910 figures below)
Rural population of counties shown thus:	*15,824*	(1920 figures above)
	16,245	(1910 figures below)
Population of cities and towns shown thus:	19,457	(1920 figures above)
	19,027	(1910 figures below)

POPULATION OF INDIANA

	1920	1910
Urban	1,482,855	1,143,835
Rural	1,447,535	1,557,041
Total	2,930,390	2,700,876

Map studies. 1. What does the relative size of the black dots and circles on the Population Map show? 2. What is meant by urban population? rural population? 3. How is the total population of each county shown on the map? 4. How is the rural population of each county shown? 5. The urban population of each county can be obtained by adding the population figures shown for cities and towns. 6. The total population of each county is the sum of the urban and the rural population.

7. What was the urban population of Indiana in 1910? in 1920? 8. What was the rural population of Indiana in 1910? in 1920? 9. What do these figures show? 10. Which county has the most large cities? Why? 11. What is the urban population of your own county? the rural population?

Problems. 1. Name the ten adjoining counties which together make up the area having the most numerous cities and towns. Explain this fact. 2. In what area are cities and towns least numerous? Why is this so? 3. Name the counties. 4. Name the cities and towns for which population figures are given in each county.

5. What is the population of each of the six largest cities in Indiana? 6. What fraction of Indiana's urban population has each of these cities? 7. What advantages has each? 8. What county has the least rural population? the least urban population? 9. What natural region has the most cities? the fewest cities?

Home work. 1. What fraction of the population of its county is the population of each of the following cities? Indianapolis; South Bend; Gary; Terre Haute. 2. Make a list of the counties which have gained in total population since 1910. 3. Make a list of the counties which have lost in total population since 1910.

4. Make similar lists of the counties which have gained and lost in urban and in rural population since 1910. 5. What counties and cities are growing most rapidly? 6. Will they continue to grow? Explain your answer.

7. Write a composition to show that the facts which you have learned from the Population Map are largely a response to the conditions shown on the other maps of Indiana.

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